MONTHLY WEATHER REVIEW.

Editor: Prof. CLEVELAND ABBE. Assistant Editor: FRANK OWEN STETSON.

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The MONTHLY WEATHER REVIEW is based on data from about 3500 land stations and many ocean reports from vessels taking the international simultaneous observation at Greenwich noon.

Special acknowledgment is made of the data furnished by the kindness of cooperative observers, and by Prof. R. F. Stupart, Director of the Meteorological Service of the Dominion of Canada; Señor Manuel E. Pastrana, Director of the Central Meteorological and Magnetic Observatory of Mexico; Camilo A. Gonzales, Director-General of Mexican Telegraphs; Capt I. S. Kimball, General Superintendent of the United States Life-Saving Service; Commandant Francisco S. Chaves, Director of the Meteorological Service of the Azores, Ponta Delgada, St. Michaels, Azores; W. N. Shaw, Esq., Secretary, Meteorological Office, London; H. H. Cousins, Chemist, in charge of the Jamaica Weather Office; Señor Anastasio Alfaro, Director of the National Observatory, San José, Costa Rica; Rev. L. Gangoiti, Director of the Meteorological Observatory of Belen College, Havana, Cuba.

As far as practicable the time of the seventy-fifth meridian, which is exactly five hours behind Greenwich time, is used in the text of the MONTHLY WEATHER REVIEW.

Barometric pressures, both at land stations and on ocean vessels, whether station pressures or sea-level pressures, are reduced, or assumed to be reduced, to standard gravity, as well as corrected for all instrumental peculiarities, so that they express pressure in the standard international system of measures, namely, by the height of an equivalent column of mercury at 32° Fahrenheit, under the standard force, i. e. apparent gravity at sea-level and latitude 45°.

SPECIAL ARTICLES, NOTES, AND EXTRACTS.

THE RELATION BETWEEN STORM MOVEMENT AND PRESSURE DISTRIBUTION.

By EDWARD H. BOWIE, Local Forecaster. Dated St. Louis, Mo., November 30, 1905.

The influence exerted by the pressure of contiguous regions of high pressure, or the flow of air therefrom, to modify the rate and the direction of progression of a storm center, is a principle recognized by practically all writers on the subject of weather forecasting. The first mention of such an influence is nearly coincident with the earliest use of synoptic charts in weather predicting. It is a matter of common observation that in the middle latitudes, where storms move in an easterly direction, a storm center lying near and south of an area of high pressure pursues a course that deviates to the right of the track that storms of that particular locality normally travel, and the converse is true when a storm is charted north or northwest of an area of high pressure; again, when an area of high pressure covers the region toward which the storm would move under normal conditions, then its progressive motion is retarded, but when an area of high pressure develops in the rear of a storm its movement is accelerated.

In view of the foregoing, it is seen that the influence of the pressure distribution adjacent to a storm center in causing a storm to depart from a normal course should be considered in forecasting; and it follows that the explanation of an abnormal storm movement is often to be found in the unequal pressure distribution surrounding the storm center. Assuming anomalous storm movements to be mainly due to anomalous pressure distribution, it is obvious that the direction and velocity of storm movement could be predetermined were it possible to obtain correct values of (1) the displacement of the storm center arising from the unequal pressure distribution, and (2) the value of the drift of the upper air currents that appear to carry the storm with them. In order to represent quantitatively the displacement or movement of the storm center due to unequal pressure, each tenth of an inch increase in barometric pressure, measured outwardly from the storm center along lines radiating to the north, northeast, east, etc., has after many trials been considered as equivalent to a movement of the storm center by 62.99 miles, or to a vector of 0.40 inch, or one centimeter, in length, on a map the scale of which is about 160 miles to the inch.[1] The pressure is considered along the lines radiating northward, northeastward, etc., from the center of the storm outward to the points where the general trend of the isobars is no longer approximately perpendicular to these radii.

The general resultant of these eight vectors represents the total influence of the pressure [or some equivalent flow of air.—*C. A.*] toward the storm center from the surrounding regions of high pressure, and is assumed to show both the direction and the extent of the 24-hour displacement of the storm center so far as it is due to the unequal distribution of pressure. If the pressure of the air from all directions toward the storm center be a factor in determining the direction and the velocity of the movement of the center, it is apparent that this "general pressure resultant" summarizes one of the forces that determine the storm's path.

By considering the above resultant pressure effect as one of two component forces that cause the storm center to move along its path, it is possible to find the other component, or the so-called "eastward drift," by resolving an observed 24-hour movement into its two corresponding components by the parallelogram of forces.

It may be expected that the second component, or drift, should have approximately the same direction and value for two or more storms in the same locality for any given month of the year, and in fact the values when charted for each locality show an agreement that can not be wholly the result of accident.

[1] This is very nearly the scale of the Washington morning weather map (Form C), or the outline forecast map (Form A), or the Form A-C, which was prepared some years ago for special study by adding the contour lines for each 1000 feet for Canada, United States, and Mexico. The engraving from which these maps are printed represents a polyconic projection in which the linear dimensions are 1/10000000 of corresponding distances on the earth's surface. That is to say, the distance from the pole to the equator is represented by one meter, and the length of a degree of a great circle by 11.111 millimeters, or 0.44 inch. Adopting the dimensions of the Clarke spheroid of 1866, as in the Smithsonian Geographical Tables, we have for the radius of the sphere having the same surface as that spheroid 3958.8 miles; its circumference is 24873.8 miles, and its surface 196,940,400 square miles. A degree of a great circle is, therefore, 69.094 miles, which, on the scale of 1/10000000, becomes 0.4378 inch on the morning weather map, or at the rate of 157.8 miles to the inch; nine-tenths of a degree is 62.18 miles; 0.91 degree is 62.99 miles.

To illustrate the method of computing the pressure component, draw lines on any map outward from the center of the storm and measure the rise of pressure along each radius so long as that radius is nearly perpendicular to the isobars. We obtain the figures in the following tables from the maps of May 25, 26, 27, 28, and 29, 1903:

TABLE 1.—*May 25, 1903, storm center over New Mexico.*

Measured toward—	Difference in pressure.	Pressing toward—	Resolved pressure.			
			E.	W.	N.	S.
	Inch.		*In.*	*In.*	*In.*	*In.*
n.	0.20	s.	0.00	0.00	0.00	0.20
ne.	0.20	sw.	0.00	0.14	0.00	0.14
e.	0.50	w.	0.00	0.50	0.00	0.00
se.	0.20	nw.	0.00	0.14	0.14	0.00
s.	0.00	n.	0.00	0.00	0.00	0.00
sw.	0.00	ne.	0.00	0.00	0.00	0.00
w.	0.20	e.	0.20	0.00	0.00	0.00
nw.	0.20	se.	0.14	0.00	0.00	0.14
Sum			0.34	0.78	0.14	0.48
Excess				0.44		0.34

Resultant 0.56 inch, S. 52° 18′ W.

TABLE 2.—*May 26, 1903, storm center over northwestern Texas.*

Measured toward—	Difference in pressure.	Pressing toward—	Resolved pressure.			
			E.	W.	N.	S.
	Inch.		*In.*	*In.*	*In.*	*In.*
n.	0.10	s.	0.00	0.00	0.00	0.10
ne.	0.00	sw.	0.00	0.00	0.00	0.00
e.	0.60	w.	0.00	0.60	0.00	0.00
se.	0.30	nw.	0.00	0.21	0.21	0.00
s.	0.30	n.	0.00	0.00	0.30	0.00
sw.	0.30	ne.	0.21	0.00	0.21	0.00
w.	0.30	e.	0.30	0.00	0.00	0.00
nw.	0.20	se.	0.14	0.00	0.00	0.14
Sum			0.65	0.81	0.72	0.24
Excess				0.16	0.48	

Resultant 0.51 inch, N. 18° 26′ W.

TABLE 3.—*May 27, 1903, storm center over Wisconsin.*

Measured toward—	Difference in pressure.	Pressing toward—	Resolved pressure.			
			E.	W.	N.	S.
	Inch.		*In.*	*In.*	*In.*	*In.*
n.	0.10	s.	0.00	0.00	0.00	0.10
ne.	0.10	sw.	0.00	0.07	0.00	0.07
e.	0.50	w.	0.00	0.50	0.00	0.00
se.	0.70	nw.	0.00	0.49	0.49	0.00
s.	0.40	n.	0.00	0.00	0.40	0.00
sw.	0.40	ne.	0.28	0.00	0.28	0.00
w.	0.20	e.	0.20	0.00	0.00	0.00
nw.	0.10	se.	0.07	0.00	0.00	0.07
Sum			0.55	1.06	1.17	0.24
Excess				0.51	0.93	

Resultant 1.06 inches, N. 28° 44′ W.

TABLE 4.—*May 28, 1903, storm center over northwestern Texas.*

Measured toward—	Difference in pressure.	Pressing toward—	Resolved pressure.			
			E.	W.	N.	S.
	Inch.		*In.*	*In.*	*In.*	*In.*
n.	0.30	s.	0.00	0.00	0.00	0.30
ne.	0.20	sw.	0.00	0.14	0.00	0.14
e.	0.60	w.	0.00	0.60	0.00	0.00
se.	0.30	nw.	0.00	0.21	0.21	0.00
s.	0.10	n.	0.00	0.00	0.10	0.00
sw.	0.10	ne.	0.07	0.00	0.07	0.00
w.	0.10	e.	0.10	0.00	0.00	0.00
nw.	0.40	se.	0.28	0.00	0.00	0.28
Sum			0.45	0.95	0.38	0.72
Excess				0.50		0.34

Resultant 0.60 inch, S. 55° 47′ W.

TABLE 5.—*May 29, 1903, storm center over Kansas.*

Measured toward—	Difference in pressure.	Pressing toward—	Resolved pressure.			
			E.	W.	N.	S.
	Inch.		*In.*	*In.*	*In.*	*In.*
n.	0.60	s.	0.00	0.00	0.00	0.60
ne.	0.70	sw.	0.00	0.49	0.00	0.49
e.	0.60	w.	0.00	0.60	0.00	0.00
se.	0.30	nw.	0.00	0.21	0.21	0.00
s.	0.20	n.	0.00	0.00	0.20	0.00
sw.	0.10	ne.	0.07	0.00	0.07	0.00
w.	0.40	e.	0.40	0.00	0.00	0.00
nw.	0.40	se.	0.28	0.00	0.00	0.28
Sum			0.75	1.30	0.48	1.37
Excess			....	0.55	.....	0.89

Resultant 1.05 inches, S. 31° 43′ W.

Figure 1 shows the method followed to determine the direction and amount of the 24-hour drift for a given locality; the vector x represents the direction and movement in 24 hours of the storm that was centered near Amarillo, Tex., 8 a. m., May 26, 1903; the vector x_1 represents the resultant of all the pressures acting on the storm center, as determined from the increase of pressure outward from the storm center in all directions, as shown on the weather map at 8 a. m. and as given in Table 2, illustrating the method for computing the pressure component.

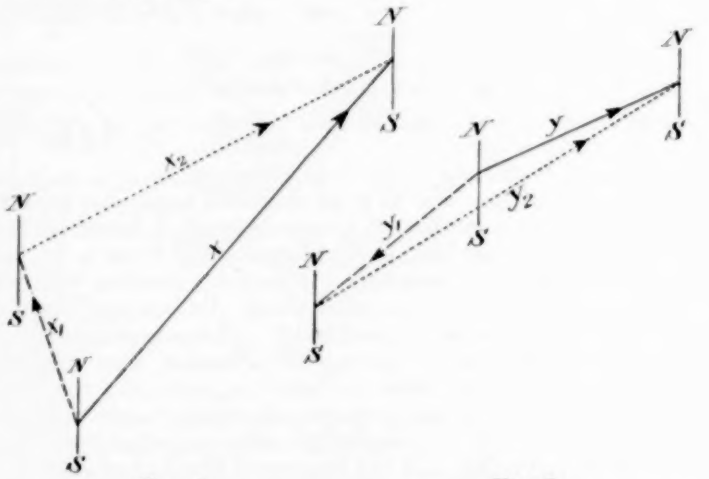

FIG. 1. FIG. 2.

In fig. 2 we present a similar study of the path of the storm that was centered near Amarillo, Tex., 8 a. m., May 28, 1903; the vector y represents the observed or actual 24-hour path of the storm; the vector y_1 is the resultant of all the pressures exerted on the storm center determined from the measured increase of pressure, as shown in Table 4.

The resultant of x and x_1 is the drift, x_2, or, conversely, the resultant of x_1 (the pressure) and x_2 (the drift) is x (the path). Similarly for y_1, y_2, and y.

Now the drift is a very general atmospheric phenomenon. The pressure components we see before our eyes, changing on every map, but the drift may be plausibly assumed to change but little for any given month and locality. Probably the average of all the observed daily paths, x, y, etc., for a series of storms will, to a large degree, eliminate the variable part of the pressure component, so that instead of going through the laborious process of resolving every storm track we might take an average that would give nearly the same result, and especially would this be the case if we took an average of only those storms for which the pressure resultants x_1, y_1, etc., are zero. That is to say, these storms will give us the values of x_2, y_2, without the labor of the resolution of each parallelogram of forces. The mean drift of storms whose pressure resultants are zero is the same as the average of the storm tracks

themselves. These have been compiled for each month and for each location as shown on the Charts, IX to XX, and are called normal storm drifts. By adopting these as the values of x_2 for any given month and place, and combining with them the values of x_1 or the pressure component for any special storm or date, we can deduce by the parallelogram of forces the value of x or a prediction of the actual path for that storm and date.

It is not possible for me to state within what limits the drifts on Charts IX to XX are correct, for the reason that their absolute values are unknown, yet I believe them to be close approximations for the several months. The Washington weather maps for 1890 to 1904, inclusive, were used in the preparation of these charts; they are not hypothetical possibilities, but were determined by resolving actual storm paths by the laborious method explained in the preceding text. It is assumed that any actual 24-hour storm track is the resultant of the effect of an eastward drift combined with the influence of the pressures acting toward the storm center. If the pressure effect be eliminated from the actual storm track, the remaining component represents the 24-hour eastward drift, and the average of many of these latter is taken as the 24-hour normal storm drift. Such averages were computed by dividing the country into 5-degree squares and grouping by months the values representing the eastward drift for all the storms that passed over the several 5-degree squares. The means thus obtained have been entered on Charts IX to XX as the normal drift for 24 hours.

Our charts of normal drifts give x_2 not only as to direction, but also as to distance, by the scale of miles on the charts, and it remains only to determine the value of x_1 on the same scale of miles before we can combine them together. This has been done by constructing a number of diagrams similar to figs. 1 and 2. In each of these diagrams the resultant pressure component, x_1, y_1, etc., as given in Tables 1, 2, 3, 4, 5, expressed in inches of barometric pressure, has been previously multiplied by a factor in order to convert it into miles. Each diagram similar to fig. 1, constructed with x in miles but x_1 in inches, will give a value of x_2, varying in length and direction; whereas if a proper scale be used for x_1 the values of x_2 may be made to agree as to either length or direction, but not necessarily as to both. I have chosen to make them agree as to direction; that is to say, I have adopted the hypothesis that the normal drift is in the same direction for any given locality throughout the whole period studied by me, but may vary in intensity with the season or month. In this way I have been able to determine the factor expressing the relation between inches of resultant pressure and miles of distance in its effect on the motion of the storm. I find that this relation is fairly constant for any given locality and month. In general, each tenth of an inch of pressure has been found equivalent to a movement of about nine-tenths of a degree of a great circle, or to 62.99 miles, or 0.40 inch on the scale of the morning weather map. Thus, for instance, in December, in Colorado, a storm center is, during 24 hours, carried eastward 725 miles by the drift; and if it is also subject to a pressure that tends to force it southward 400 miles in 24 hours, then the resulting movement is 790 miles to the southeast.

Charts XXI to XXVII illustrate the use of this system in forecasting the probable direction and rate of movement of a storm center. In these charts the vector a is the 24-hour eastward drift, b the resultant of the pressures acting toward the storm center from all directions, and c the resultant of a and b, or the path that the storm center will probably follow in the succeeding 24 hours.

The following table gives the increase in pressure, measured from the storm center outward along lines radiating to the north, northeast, east, etc., that was used in computing the vectors b on Charts XXI to XXVII.

TABLE 6.

Direction.	Number of chart.							
	XXI	XXII	XXIII.*	XXIII.†	XXIV	XXV	XXVI	XXVII
North	0.2	0.1	0.1	0.2	0.3	0.6	0.6	0.7
Northeast	0.2	0.0	0.1	0.1	0.2	0.7	0.6	0.7
East	0.5	0.6	0.5	0.2	0.6	0.6	0.5	0.6
Southeast	0.2	0.3	0.7	0.1	0.3	0.3	0.3	0.2
South	0.0	0.3	0.4	0.0	0.1	0.2	0.2	0.3
Southwest	0.0	0.3	0.4	0.1	0.1	0.1	0.2	0.3
West	0.2	0.3	0.2	0.2	0.1	0.4	0.3	0.3
Northwest	0.2	0.2	0.1	0.4	0.4	0.4	0.5	0.5

* Storm center over Wisconsin. † Storm center over Utah.

From a study of storm movement by the preceding method, it is apparent that the rate and the direction of movement of a storm center in relation to its movement along the lines of drift is governed largely by the variable component representing the displacement of the storm center arising from the unequal pressure distribution at sea level; hence it follows that when the resultant pressure acts toward the left (when facing the direction of normal progression) the storm will move to the left of the normal direction of advance, and when the resultant presses to the right the storm will move to the right. When this resultant pressure is acting in conjunction with the eastward drift, the storm's rate of movement will be accelerated; and when in opposition to the eastward drift, the storm's progress will be retarded. It appears that in nearly all instances the storm increases in intensity when forced to move to the left, and loses intensity when forced to move to the right, of the normal track or drift.

Naturally exceptions are to be found in applying the method outlined above, but in practically all instances the exception has been the result of an unforeseen increase or decrease in the pressure toward the storm center from some one or more of the several directions, which, in addition to offering an explanation of the exception, tends to prove the correctness of the general principle. Of course the application of the method is limited when the storm center is near a region from which no pressure observations are available, as, for instance, with the storms that move along the Canadian border. In cases where there are a number of ill-defined storm centers it is not always possible to determine which center will become the primary one and which centers will be dissipated, and therefore there is more or less doubt whether the deductions will be borne out by subsequent events. In nearly all instances involving exceptions, the error in predetermining the movement of the storm center is apparently due to inability to determine the exact values that should be used to represent the pressure toward the storm center from the several directions; especially is this the case when the barometric changes over large areas are rapid.

It has also been noted that when the north-south temperature gradient is strong there is a tendency for the progressive motion of storms to increase, and when the isotherms are parallel to the normal drift and are congested the tendency is for the storm to follow closely the path marked out by the isotherms, despite the fact that the pressure resultant may indicate a different path.

Again, when the areas of high pressure are moving rapidly, allowance must be made for the rapidly changing pressure distribution also.

When the isobars are parallel to the Rocky Mountains, especially with a winter high over the Plateau region, the pressure outwardly from the storm center must not be considered beyond the Rocky Mountain divide.

In order to show the results of the application of this method in actual practise, the accompanying Table 7 has been compiled from the forecast maps prepared by the author during the month of January, 1903. The same data are graphi-

TABLE 7.

Date, 1903.	Location of storm center, 8 a. m.	Increase in pressure, in tenths of inches, measured outwardly from the storm center toward: N.	NE.	E.	SE.	S.	SW.	W.	NW.	Actual movement of storm center in succeeding 24 hours.	Predicted movement of storm center in succeeding 24 hours.	Angular divergence between actual and predicted paths.
										cm.†	cm.†	°
January 1	West Gulf	2	4	2	0	0	0	0	0	7.5	6.5	15.0
2	Southeast Arkansas	3	5	4	3	2	3	3	5	14.0	12.0	13.0
3	Lake Erie	4	6	6	5	5	6	6	5	15.5	14.0	4.0
3	Near Medicine Hat	*	*	*	*	*	*	*	*	13.0	13.0	10.0
4	Iowa	2	2	1	0	0	1	5	2	10.5	14.0	17.0
5	Southern Indiana	0	0	1	2	0	0	4	1	12.5	14.5	7.0
5	Alberta	*	*	*	*	*	*	*	*	10.5	13.0	4.0
6	Manitoba	*	*	*	*	*	*	*	*	13.5	13.5	10.0
7	Lower Michigan	10	10	6	9	11	12	12	12	17.5	21.0	5.0
9	Arizona	4	5	0	0	0	0	1	3	11.5	13.0	0.0
10	Rio Grande Valley	0	5	4	2	0	0	0	4	17.0	11.0	19.0
11	Ohio Valley	2	2	7	5	4	6	7	6	23.0	23.5	3.0
20	Lake Superior	6	6	7	9	3	4	6	6	12.5	10.0	0.0
20	Central Texas	3	2	1	1	1	1	2	4	8.5	10.0	13.0
21	New Jersey	3	6	5	5	2	3	5	6	16.0	13.5	9.0
21	North Dakota	*	*	*	*	*	*	*	*	12.0	12.5	9.0
22	Upper Michigan	*	*	*	*	*	*	*	*	14.0	12.5	7.0
23	Oklahoma	5	6	5	4	3	3	4	4	10.5	10.0	3.0
24	Kentucky	3	6	4	2	1	2	1	1	5.0	5.0	9.0
26	Northwest Texas	4	1	7	3	2	2	2	4	8.0	8.0	7.0
28	Wyoming	4	5	4	5	4	5	5	3	14.5	13.5	7.0
29	Lake Michigan	*	*	*	*	*	*	*	*	9.5	12.5	4.0
Average										12.5‡	12.5‡	7.95

* Normal storm track used as predicted path; impossible to get correct pressure resultant. † Expressed in centimeters as measured on the 8 a. m. maps, where 1 centimeter = $\frac{1}{5}$ degree of a great circle, or about 62.2 English statute miles on the earth's surface, and where 0.438 inch is a degree of the great circle, or about 69.09 miles. ‡ 777.4 miles.

cally shown on Chart XXVIII. The table shows the increase in barometric pressure outward in every direction from the storm center; from the data in these eight columns the pressure resultants were determined, and thence the paths predicted by the present method. This information may be useful to any reader who cares to check the results shown by the charts.

CLIMATOLOGY OF HAITI IN THE EIGHTEENTH CENTURY.

By C. FITZHUGH TALMAN, U. S. Weather Bureau.

Foremost among the early writers upon the island of Santo Domingo, was Médéric-Louis-Elie Moreau de St. Méry, who produced three voluminous works upon the French possessions in the West Indies. Born at Fort Royal, Martinique, in 1750, he passed his early manhood in Paris, migrated thence to Haiti, and settled at the then capital of the colony, Cap Français (now Cap Haïtien). He held an important office in the administration of the colony, and also, under a commission from Louis XVI, traveled extensively through the French West Indies, collecting material for a work which was published in 1785 under the title, "Lois et Constitutions des Colonies Françaises de l'Amérique sous le Vent, de 1550 à 1785." Returning to France, he took an active part in the French Revolution, until obliged to flee from his political enemies to the United States. It was during a period of exile in the latter country that he published two works descriptive of the island of Santo Domingo; one devoted to the Spanish part of the island, and the other to the French part.

Having recently obtained access to the latter of these works,[1] I have, at the suggestion of the Editor of the MONTHLY WEATHER REVIEW, extracted and translated those portions relating to the climate—a subject to which the author devotes a generous share of attention. The original material is scattered through the two volumes of which the work is composed; and it is frequently so diffuse in style and so overloaded with trivial details that a certain amount of condensation was imperative; but I have not intentionally omitted anything of strictly meteorological interest and importance.

Haiti enjoys the rare distinction of having been more thoroughly studied climatologically in the eighteenth century then in the nineteenth. As a French colony Haiti reached a high state of civilization, and among its prosperous inhabitants were many assiduous cultivators of the sciences. A scientific society, the Cercle des Philadelphes, flourished in colonial days, and it is understood that a volume (Tome II) of the memoirs of this society was devoted to meteorology, but, in spite of diligent inquiry, I have not been able to obtain or locate a copy of this work. Possibly it was the source from which Moreau de St. Méry drew most of his information upon the climate of the colony.

Whereas under French rule meteorological observers were well distributed over the country and interesting local peculiarities of the climate were brought to light, since the war of independence meteorology has been almost entirely neglected except at Port au Prince. At the latter place regular observations were maintained by Ackermann from 1863 to 1868, inclusive; since 1888 they have been made by Scherer, of the Collège St. Martial. Scherer's observations are published in detail in the Jahrbücher of the Vienna Central-Anstalt; and both Ackermann's and Scherer's observations were fully discussed in the "Anhang" to the Jahrbuch for 1893, and in the Meteorologische Zeitschrift for March, 1897, pp. 116–119. Outside of Port au Prince and its environs no observations are known to have been made in Haiti during the nineteenth century, with the exception of brief series at Cap Haïtien and Sans Souci,[2] about 1819, and rainfall observations at one or two of the stations recently organized by Professor Scherer.

Finally, in 1905, the Société Astronomique et Météorologique de Port au Prince was organized, having, as one of its objects, the inauguration of climatological observations throughout the country. The monthly leaflets published by this society, as well as those published by Professor Scherer, now include results from a few stations outside of the capital.

In the following translation will be found particulars regarding the climate of most of the parishes into which the French colony was divided. Although the boundary lines of the parishes are not given on the accompanying map, fig. 1, the location of each parish is indicated in a general way by that of its chief town, which usually bears the same name. In the case of the Artibonite plain and river the author has found it convenient to treat several contiguous parishes together, as they have similar physical features.

[1] Moreau de St. Méry, M. L. E. Description topographique, physique, civil, politique et historique de la partie française de l'Ile Saint-Domingue. Philadelphie. 1797. 2 vols. This work was republished in 1875 (Paris. Morgand. 2 vols., 8°), but I have seen only the original edition. It is to this day regarded by the Haitians as the highest authority upon the physical geography of their country, and is quoted at length in the latest Haitian gazetteer (Rouzier, S. Dictionnaire géographique et administratif d'Haïti. Paris. 1899).

[2] Tippenhauer, L. G. Die Insel Haiti. Leipzig. 1893.

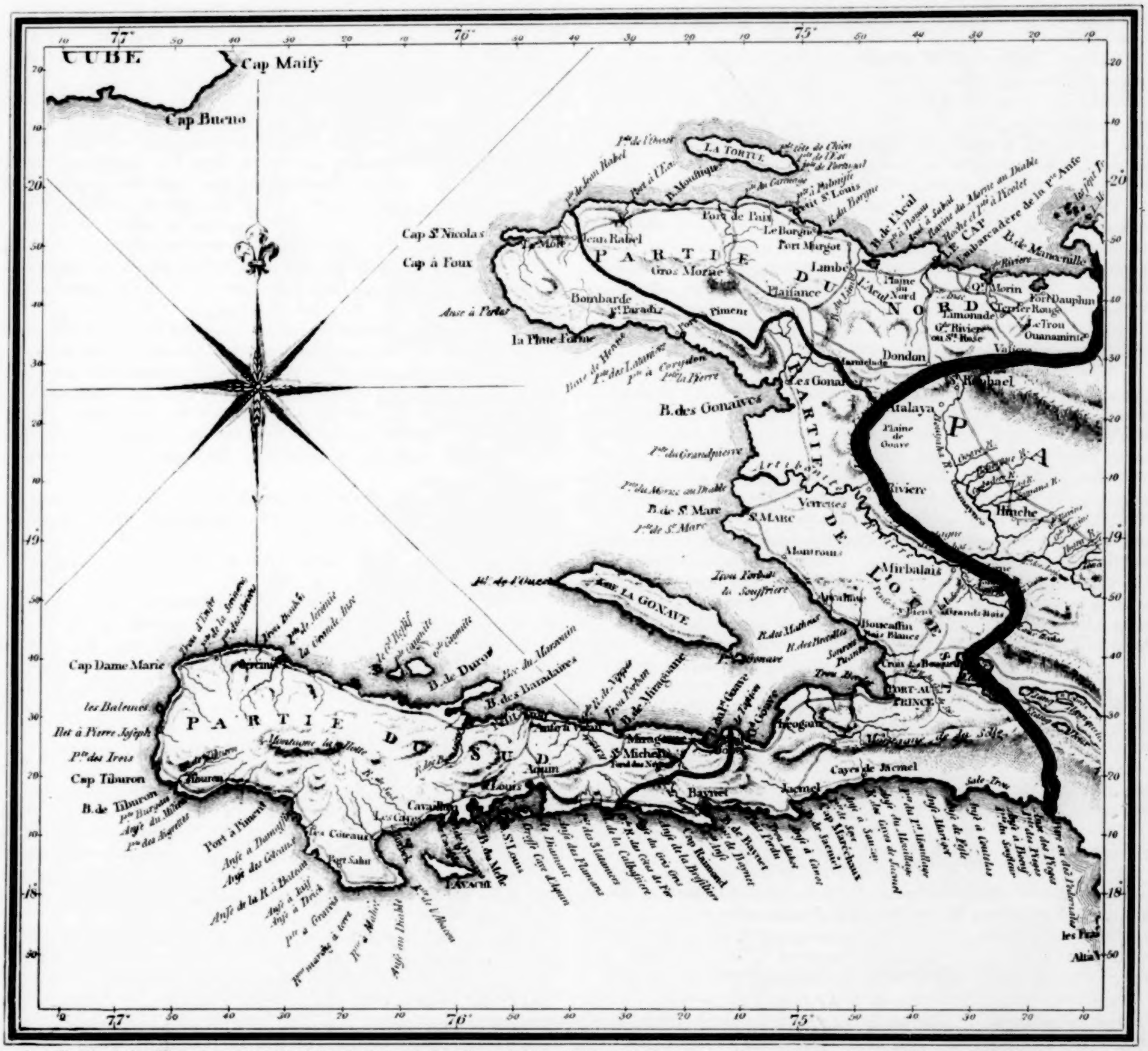

Fig. 1.—Chart of the French part of the island of Santo Domingo in the eighteenth century. (From Moreau de St. Méry: "Description de la partie française de l'Ile St. Domingue.")

In St. Méry's work the temperatures are invariably expressed in Réaumur degrees, and rainfall measurements and barometer readings in French inches and lines. For these the translator has supplied, in brackets, the centigrade and metric equivalents, respectively, in order that the observations may be readily comparable with those of modern observers.

NORTHERN PART.

Parish of Fort Dauphin.—The climate is extreme. After an annual drought, which ordinarily lasts from February to May or June, the rains become excessive with the first thunderstorms.

Parish of Ouanaminthe.—The climate of this parish is similar to that of the parish of Fort Dauphin, but with this peculiarity, that, especially in the canton of Ouanaminthe proper, the droughts are much more severe and the rains which follow them cause much greater floods. Violent thunderstorms occur; in fact the thunderstorms which move toward the northern part of the colony take their rise in the chain of Cibao and the mountains near Maribarou, and it has passed into a proverb to say, when a distant thunderstorm is heard, "Maribarou is growling" ("*Maribarou gronde*"). Lightning strikes here quite frequently, and has caused many fires. On June 17, 1783, at 2:20 p. m., after a furious wind and rainstorm, a fall of hail occurred, some of the hailstones being as big as one's fist. It lasted about twenty-eight minutes and was followed by a shower. Fortunately the rain which preceded the hailstorm had caused the negroes and animals to get under shelter, otherwise they would have been injured or even killed by the enormous hailstones.

On October 2, 1764, lightning struck in the town of Ouanaminthe, where it killed M. Belleville, an attorney of Fort Dauphin, M. Chaillou, an ex-notary, and a carpenter. Ten other persons who were in the room were knocked over by the shock without receiving any injury; but two Spanish soldiers,

of the guard post on the other side of the Massacre [River], were killed.

Parish of Vallière.—The situation of this parish, surrounded by mountains, protects it from the droughts which devastate the open plains in its vicinity. On the other hand it is subject to excessive rainfall and floods. In the hurricane of August 4–5, 1772, which was felt from Ouanaminthe to St. Marc, the wind, which blew from the southeast, threw down buildings and destroyed the manioc, rice, and peas. The Acul de Samedi, the Acul des Pins, and Nouvelle-Bretagne were ravaged; the coffee crop, which was on the bushes, was nearly half destroyed, and what remained in the storehouses of the crop of the preceding season was considerably damaged. An abundant rain, lasting 24 hours, added floods to the list of calamities.

The climate of Vallière is quite cool, and would even be found cold by the inhabitants of the cities. The fruit trees of France could be naturalized here.

Parish of Terrier Rouge.—The climate of Terrier Rouge is generally dry. This parish suffered extremely from the drought which prevailed here from the end of August, 1785, to April, 1786, and which is believed to have caused spontaneous fires in several cane fields.

Parish of Le Trou.—The climate of the plain of Le Trou is made known through the observations of Mr. Warlock in 1783, 1784, 1785, and 1786 on the Craon estate, situated about halfway between the eastern and western extremities of the plain and at the foot of the mountains. It should be observed that, like the Dubuisson estate adjoining, this place receives rain squalls in which the rest of the plain does not share. To make the observations apply to the plain generally one should deduct a few inches from the rainfall.

The following are the results of these observations:

Year.	Number of rainy days.	Total rainfall.		Equivalent in millimeters.
		*Inches.	Lines.	
1783.....	76	49	5	[1338]
1784.....	109	73	2	[1981]
1785.....	81	40	1	[1085]
1786.....	85	55	7	[1505]

*French inch=1.065765 English inches.

The rainy months are June, July, August, September, October, and November, for which the results were:

Year.	Number of rainy days.	Total rainfall in inches.	Equivalent in millimeters.
1783.....	38	23	[623]
1784.....	71	46	[1245]
1785.....	51	19	[514]
1786.....	61	38	[1029]

The observer remarks that of these four years the most favorable for agriculture was 1785, because it was preceded by a very rainy year and one in which the rainfall was evenly distributed. For the opposite reason the year 1786 was a year of drought, in which wells, pools, brooks, and even rivers were dried up, although it had more rain than 1783 or 1785. But drought had prevailed from November, 1785, to July, 1786; so that the evaporation was excessive during the first rains that succeeded this long interval.

The greatest height of the barometer during these four years was 28 inches 4 lines [766.98 mm.], and its least height 27 inches 6 lines [744.42 mm.].

The Réaumur thermometer indicated a maximum temperature of 32° [40° C.], and a minimum of 15° [19° C.].

The prevailing winds are east-northeast by day, and west-southwest at night. The rarest are those from northwest and southeast.

On May 5, 1786, intolerable heat prevailed at Le Trou. The Réaumur thermometer, placed in the shade and having a north exposure, stood at 19° [24° C.] before sunrise, and rose to 31½° [39° C.] at 2 o'clock. The wind was southerly and variable. More than two hundred wardrobes (*armoires*) and tables of mahogany were burst and split from top to bottom.

The climate of the mountains is much cooler than that of the plain, and droughts are much less felt, especially in the east. The canton of Écrevisses, for example, about three leagues in circumference, has a soil somewhat superior to that of Moka, which it adjoins. It formerly received from 90 to 100 inches [24 6 to 2707 mm.] of rain per annum, and the hurricane and rains of August 4–5, 1772, which devastated it, augmented this proportion, but since 1773 it has been subject to drought like the rest of the parish. The year 1777 was exceptional, and nearly the above amount fell. The drought of 1776 induced M. Chevalier, an inhabitant of the mountain of Écrevisses, to plant cotton, which succeeded perfectly. Encouraged by this attempt, he planted an immense quantity in 1777, and it was entirely destroyed by the rains. In the summer of 1781 the canton of Écrevisses was favorably treated. The "norths" generally furnish a third part of the rainfall of the year.

["Norths" are persistent north winds, characterizing certain seasons. Sometimes the term is applied to what we now call northers. Cf. Dampier's "Voyages" and the accounts given by other early navigators of the meteorology of the Caribbean.]

Parish of Limonade.—The Réaumur thermometer, during 25 years of observations in the plain of Limonade, in the vicinity of the sea, did not rise above 28° [35° C.], and did not fall below 18° [22½° C.]. The temperature in the mountains varies according to elevation and locality. In winter it ranges commonly from 9° [11° C.] at dawn to 16° [20° C.] in the greatest heat of the day, and in summer from 18° to 22° [22° to 28° C.], except that days totally without breeze may carry it up to 27° [34° C.], a very rare occurrence.

The amount of rain falling annually in the plain may be estimated at from 80 to 90 inches [2166 to 2436 mm.]. Sometimes, during the season called in the Windward Isles "hivernage," i. e., the period from July to October, little wind squalls occur, which unroof and overturn the negro cabins and even the cane barns *(cases à bagasses)*, damage tile and slate roofs, and destroy the banana plants.

These wind squalls are accompanied by excessive rain, causing disastrous floods. The destruction wrought by these floods, however, is not to be compared to that due to droughts, which for twenty years have been continually growing more frequent.

Parish of Sainte Rose.—The climate is mild at Sainte Rose, and even on the summit of la Montagne Noire (Black Mountain) a temperature of 9° R. above freezing [11° C.] has been observed during the night. The finest vegetables, superb flowers, and large artichokes grow on this mountain, where more than one inhabitant of the Cape [i. e., the town of Cape Haïtien] or the plains has recovered his health in an atmosphere which seems sharp and cold by contrast with the heat of the Tropics.

Formerly the annual rainfall at Sainte Rose was estimated at 90 inches [2436 mm.]. But Santo Domingo is continually growing dryer, and for some years past hardly two-thirds of this amount has been observed. The rains are brought by the norths and by thunderstorms, but the latter are the most potent cause, for the six rainy months are generally considered to be June–November, which give seven-tenths of the rainy days and five-eighths of the annual rainfall.

Parish of St. Louis du Morin.—This parish has a comparatively hot climate, and it is in the middle rank with regard to rainfall. The lower part of the plain may receive annually 50 inches [1354 mm.] of rain, and this quantity is somewhat

exceeded in the vicinity of the "mornes" [isolated hills or mountains], where, moreover, the moisture is conserved for a longer time. The rainy months are May-December, and the driest month is April. The heat is extreme in the long days, and in the absence of a breeze. A Réaumur spirit thermometer at the town of Petite-Anse, at noon September 7, 1775, stood at 24° [30° C.] in the shade, and rose to 49° [61° C.] in the sun. In October, 1779, a similar thermometer, exposed in a well-ventilated room, in the same town, rose to 34° [42½° C.] at 4 p. m.

Parish of Dondon.—The greatest range of temperature observed in ordinary years is 20° R. [25° C.]; for the temperature fluctuates between 5° R. [6° C.] and 25° R. [31° C.] in exposed valleys. In the summer the thermometer ranges from 12° to 24° R. [15° to 30° C.]; in winter from 7° to 15° R. [9° to 19° C.]. In the middle elevations of the mountains the range is 10° to 22° R. [12½° to 27½° C.] in the summer, and 4° or 5° to 12° R. [5° to 15° C.] in winter.

Dondon is exposed to southwest squalls, which are the precursors of violent thunderstorms, and which, though of brief duration, are very destructive. Sometimes this wind lasts for a considerable time, as during the disastrous hurricane of August 4–5, 1772.

Parish of Marmelade.—This parish was so named by the inhabitants of surrounding districts because the excessive rains make of its soil a kind of mush or *marmelade*.

A greater variety of climate prevails in this parish than in the other parishes. In the canton of Marmelade proper, the temperature corresponds to that of the inland provinces of France at the end of a beautiful month of May. In the six months from October to April the Réaumur thermometer descends to 9° [11° C.] at sunrise, and rises only to 16° [20° C.] toward midday. In the other six months it rises to 24° [30° C.] by day and falls to 20° [25° C.] at night. It rarely reaches 27° [34° C.], even during the hottest years. The nights are cool, and one can seldom dispense with a cotton quilt. The rainfall is abundant, and may be estimated at as much as 100 inches [2707 mm.]. Thunderstorms are frequent and destructive. They occur, however, only in summer, are frequently nocturnal, and are of brief duration; hence they do not prevent the enjoyment of blue skies, which continue even during the prevalence of the norths.

In the canton of La Soufrière rain and fog are frequent. The weather in this canton is often cold enough, even in August, to make a fire agreeable.

In the canton of Ennery it rains much less than at Marmelade, and scorching heat is felt, which is attributed to the proximity of the Spanish savannas. The heat seems to increase with the clearing of the land.

Parish of Petite-Anse.—The climate of this parish may be studied from the trustworthy observations of M. Odeluc, made on the Galifet plantation, near the church, during the last four months of 1784 and the years 1785 and 1786.

Instruments: Spirit thermometer, exposed in the shade, in a room nearly always open, windows closed only by Venetian blinds, and facing the north. Rain gage a tin vessel, one cubic foot in volume, graduated, mounted on a pedestal, and isolated. Evaporation measured in a tin vessel eight inches square in horizontal section by five inches deep, graduated and set in a wooden box filled with earth.

Last four months of 1784.

Highest temperature in shade: (September 11, midday) 27° R. [34° C.].
Lowest temperature: (December 23, before sunrise) 14° R. [17½° C.].[3]
Difference: 13° R. [16° C.].
Rainfall: 13 inches, 11 lines [377 mm.].
Evaporation: 25 inches, 5 lines [688 mm.].
Rainy days: September, 10; October, 6; November, 10; December, 6.
Prevailing winds: east, north, and southwest.

[3] On December 31, at 6 a. m., the temperature out of doors fell to 11½° R. [14° C.].

1785.

Highest temperature	25½° R. [32° C.].
Lowest temperature	14° R. [17½° C.].
Difference	11½° R. [14° C.].
Rainfall	75 inches, ¼ line [2031 mm.].
Evaporation	70 inches, 5 lines [1906 mm.].

1786.

Only 29 inches 2 lines [790 mm.] of rain, half of which fell in October and December. Extreme dryness characterized the first four months of the year. During February, March, and April southwest winds so hot as to cause the splitting of furniture and the breaking of earthenware vessels.

Parish of Cap Français. [Generally referred to as "*le Cap*," "the Cape." The modern Cap Haïtien.] The town is shut in by mountains on its north and west sides, and in part on its south side. It is fully exposed to the morning sun, while the sea breeze is turned aside by the mountains back of the town and hardly tempers the heat. A hot climate is the result. A Réaumur spirit thermometer, shaded and exposed to the north, gives annual extreme readings of 16° [20° C.] and 28° [35° C.].

January is commonly very rainy and is likely to have winds from northeast to northwest. The mountains appear hazy in the distance. The temperature is 16°–18° R. [20°–22½° C.] in the morning; 20°–21° R. [25°–26° C.] at noon.

February is very similar to January, but is marked by greater cloudiness, while the rains are less continuous.

March resembles February, but the north wind is sometimes replaced by a west wind, raising the temperature; the thermometer reads one or two degrees higher than in January.

April is very variable from year to year; sometimes it prolongs the period of the norths and rains, but more often it is dry; violent northeast winds spring up, "brises carabinées"[4] are frequent, and thunderstorms occur. The temperature continues to rise.

In the first part of May the strong breezes of April still prevail; they are succeeded by southerly winds in the latter part, with a stifling atmosphere and frequent thunderstorms. There have been years (e. g., 1775) when for six successive weeks a daily thunderstorm has burst upon the Cape at nearly the same hour (between 5 and 6 in the evening). Sometimes it lasts only an hour or two, at other times it continues far into the night.

June begins like the latter half of May; in both months the temperature reaches 24° or 25° R. [30° or 31° C.]. The thunderstorms are shorter and less regular and cloudy skies are more frequent. Violent northeast winds reappear at the end of the month, and the thermometer shows alternations of heat and cold.

During July thunderstorms still occur from time to time, and also rains; but the heat is greatly increased and reaches 25° and 26° R. [31°–32½° C.] at midday. The winds are variable and pass from northwest to southeast; they hardly seem to cool the air.

August is dry; rain only occurs with a thunderstorm; the temperature is the same as in July.

It is in September that the climate is most trying and that the temperature reaches its highest point. The winds are irregular, and even lacking for days together. The thermometer reaches 28° R. [35° C.] and even higher at times. If occasionally a little rain occurs the air is merely made closer by it.

October is looked forward to with impatience; unless the norths are delayed it comes as a relief after six months in which the heat[5] has been an incessant cause of complaint. If the norths make their appearance the temperature no longer rises above 23° or 24° R. [29°–30° C.]; if they are delayed it reaches 25° R. [31° C.].

[4] *Brise carabinée.* Brise soudaine et violente comme un coup de carabine.—Larousse.

[5] "Celle-ci faisait dire à quelqu'un, avec assez de verité, qu'à Saint-Domingue on passait la moitié de son temps à suer et l'autre à s'essuyer."

In November the thermometer falls to 18° R. [22½° C.], but also rises to 24° R. [30° C.] unless the norths are very pronounced.

December also belongs to the season of norths, but is sometimes absolutely dry. The thermometer falls to 16° [20° C.]. Not infrequently, however, thunderstorms occur, adding their heavy rains to the fine and penetrating rains which accompany the north winds.

During the hot months the nights are generally as hot as the afternoons, and are very oppressive.

Thunderstorms are generally very severe at the Cape, and lightning frequently strikes here.

Toward the end of 1772 there were several months of rain and great floods. In 1732 the rains were so continuous that public prayers for their cessation were offered during October. Destructive rains also occurred in May, 1735, during several months of 1752, and in April, 1766. During the last four months of 1787 it rained every day.

On the other hand, a severe drought prevailed during eleven months of 1726. April, 1743, terminated a drought of six months' duration. Droughts and famine occurred in 1753 and 1754. In 1757 there were more than four months of drought. The same scourge reappeared at the beginning of 1764 and 1769, and it has been very frequent since. It prevailed at the beginning of 1774; from January to August, 1776; at the end of 1778 and the beginning of 1779; from the end of 1780 to May, 1781; from the end of 1785 to September, 1786. Cruel famines accompanied the droughts of 1774 and 1778. No other drought, however, equalled that of 1786, which in some places lasted a year. Excessively high temperatures prevailed, and all the wells were dried up.

The winds, also, display their fury at the Cape. August 14, 1680, is famous for a terrible hurricane. In the night of November 13–14, 1765, there was a frightful hurricane, which greatly damaged the houses of the town, while all the vessels in the roadstead suffered, many small craft being sunk. A north on October 15, 1780, unroofed several houses. On September 27, 1785, a moderate hurricane was experienced.

Parish of Limbé.—Of all the parishes in the northern part of the island, that of Limbé receives the most rain. The rainfall from the first of April, 1783, to the end of March, 1784 [one year], has been calculated at 17 feet 7 inches 8 lines [5730 mm.]. These rains, though sometimes harmful on account of overabundance, insure the inhabitants against the occurrence of the droughts which so frequently devastate the other parts of the island. Droughts are not entirely unknown, however. The drought of 1786 was severely felt here.

Parish of Plaisance.—The rivers of Plaisance are never dried up, the rains being too abundant to permit this. The annual rainfall is estimated at 80 inches [2166 mm.], but the amount is decreasing.

Partly to the abundant rains, and partly to the conformation of the flat portions of the parish, is attributed the phenomenon of a fog of almost daily occurrence. It forms sometimes before sunrise, sometimes later; and varies greatly in density. Its base is most often on the ground, but sometimes there is a well-marked interval beneath it. The colonists consider this phenomenon a trustworthy indicator of the weather; if the fog is gradually dissipated, it promises a fine afternoon; if it rises, rain is near at hand. In the rainy season the fog does not often occur in the valleys, but seeks the high places; it disappears between 8 and 9 o'clock in the morning.

Plaisance is for the most part mountainous, and even its valleys are at a considerable elevation above sea level; hence a cool climate. The maximum temperature in the valleys is 25½ R. [32° C.], and at the summit of the mountains it does not rise above 22° R. [27½° C.]. In general, the temperature is cooler than that of the neighboring parishes by as much as 3° or 4° R. This difference in temperature may be taken as one of the causes of the condensation of moisture over this well-watered region, especially as the fog is absent when the wind blows during the night.

It is not very rare to see the temperature fall in a few hours as much as 7° or 8° in the higher parts of the mountain chains which border this parish. The cold then seems greater by contrast, though the thermometer still indicates 14° or 15° R. [17½–19° C.].

Parish of Port Margot.—According to the observations of M. Le Gras, made on his wife's plantation, there were at Port Margot:

In 1781, 93 rainy days. In 1782, 112 rainy days. In 1783, 146 rainy days, yielding 158 inches, 10 lines [4300 mm.] of rain. The rivers were in flood from the 1st to the 21st of November, doing incredible damage. In 1784, 160 rainy days, and 123 inches [3330 mm.] of rain. The month of March, which generally is not rainy, yielded 20 inches 6 lines [555 mm.] of rain in 15 days.

The foregoing observations were made near the center of the plain; on the coast the rainfall is about one-fifth less, near the mountains about two-fifths more. In spite of the considerable rainfall fog is rare.

Parish of Le Borgne.—According to observations made by M. Odelucq, on his plantation, in the canton of Vallée de Josaphat, or Joseph, in the southwest, the highest temperature during 1785 was 22° R. [27½° C.], and the lowest 12° R. [15° C.]. One hundred and forty-six days with rain gave 340 inches, 1 line [9206 mm.] of rainfall.[6] According to observations made by Father Balthazar, curé, during the first six months of 1788, the highest temperature was 22° R. [27½° C.] at midday, and the lowest 15° R. [19° C.] at 6 a. m. The rainfall was 71 inches, 1½ lines [1925 mm.].

Parish of Gros-Morne.—The air of Gros-Morne is very healthy. The regular east and east-northeast breezes contribute greatly, no doubt, to its salubrity. At the same time the climate is very dry, and sometimes no rain falls for six months, whence results great damage to crops and live stock.

Parish of Petit St. Louis, or St. Louis du Nord.—The air is generally healthy, though the climate is so rainy that a month without rain is regarded as a drought. The temperature is similar to that of Port de Paix.

A coffee mill on the estate of M. Dubuisson was struck by lightning, which did some damage to the woodwork. The following day M. Dubuisson, in showing to a visitor the effects of the lightning, touched one of the pieces of wood and received a violent shock, which caused his arm to swell and rendered him ill. The mill had upon him the effect of a Leyden jar.

Parish of Port de Paix.—According to the meteorological observations made on the Souverbie plantation, which adjoins the town of Port de Paix, from 1775 to 1785, the Réaumur thermometer rose only twice to 28° [35° C.], viz., on June 15, 1775, and October 25, 1776, and did not fall below 14° [17½° C.] above freezing. Those made on the plantation of M. Gauché, at the lower entrance to the canton of Haut Moustique, give for the mean temperature, at 6 a. m., 15° to 20° [19–25° C.]; at midday, 22° to 26° [27½–32½° C.]; except that in March and April the temperature is sometimes 13° [16° C.] in the morning and 19° [24° C.] at midday. Only three times did the temperature rise to 26½° [33° C.].

Thundershowers generally occur between noon and two o'clock. They come with equal frequency from east and west, but rarely from the south. Rains were excessive in May and June, 1689.

[6] The duration of the observations is not stated. Hann (Met. Zeit., 1889, p. 212) follows Moreau de Jonnès in assuming that this was one year's rainfall, but it seems much too great.

On August 15, 1784, the parish experienced a moderate gale, which threw down nearly all the banana plants.

WESTERN PART.

The western part has less rain than the northern part. This is due to three causes. Firstly, the chain of mountains along the eastern frontier opposes a barrier to the passage of the clouds carried by the east wind. Secondly, the configuration of the coast and the topography of the country cause the prevailing easterly winds to curve about, after passing the mountains, and blow in from the west,[7] thus helping to oppose the passage of the clouds over the mountains. Thirdly, the promontory which terminates in Môle St. Nicolas hinders the north winds, which prevail during certain months of the year, from bringing their moisture to this portion of the island.

Rain falls, however, in the western part, and between the end of March and the middle of May it is usually preceded by haze or fog.

The first five months of the year are the most favorable to health, while the months from August to November are the most unhealthful.

Parish of Môle St. Nicolas.—Here the sea breeze is easterly and blows with much force. In recent years, however, westerly winds, which were formerly very rare, have become quite frequent, and are attended by excessive heat.

Parish of Bombarde.—This parish resembles that of the Môle in its liability to drought. After the hurricane of 1772 there was a cruel drought which extended nearly into 1774. A careful observer has found that Bombarde received in the twelve years 1774–1785 28 feet 10 inches 9¾ lines of rainfall, or an annual average of about 2 feet 5 inches [785 mm.], which would have sufficed had the rain been favorably distributed with regard to the stages of plant growth.

Parish of Port-à-Piment.—The climate of Port-à-Piment varies with the locality, but is everywhere very healthful. In the plain of this name the skies are nearly always serene, the air is brisk and warm, but the nights are always cool. The winds are regular during nine months of the year. From November to March the north and northeast winds are insupportable on account of the white dust with which they are charged and which is blown up from the soil. One remarkable phenomenon of the plain of Point-à-Pitre is that it never has dew. Deliquescent salts or pieces of paper show no effects of moisture after a night in the open air, and one may sleep out of doors with impunity, even when exposed to moonlight, which many people in the West Indies believe augments the real danger of sleeping in the dew.

The rains in this plain are local, and occur during the season of thunderstorms, i. e., from May to the end of September. The spring and winter are always dry. The rainy period is not, however, to be depended upon; no part of the colony is more afflicted with droughts than Port-à-Piment. According to old colonists, this scourge once lasted three years without interruption, and all the live stock perished. In 1779 and 1780 there were eighteen months during which not a drop of rain fell.

The Réaumur thermometer rises to 32° [40° C.] during July and August, remaining at 25° [31° C.] during the night. In October it stands at 28° [35° C.] at 3 p. m., the time of the maximum, and 22° [27½° C.] at night. From November through June the nights are cool, and even by day the temperature often falls to 16° [20° C.].

If during the period of the north wind the west wind becomes strong enough to offer much resistance to it, both waterspouts and sandspouts are observed in this region. The former are attended with a dull sound like that which precedes an earthquake. The latter are less lofty than the former, of greater volume, and of shorter duration, and disappear near to their point of origin; no sound accompanies them. They may last for a quarter of an hour.

In the Plaine du Parc the weather is very rainy during the thunderstorm season; but, although it is not so dry at other seasons as Port-à-Piment, it is nevertheless subject to very severe droughts. Terre-Neuve, on the other hand, has frequent rains, as its mountains, except on the side facing the sea, are watered by both the norths and the thunderstorms. The air is pure and the climate cool. Bras-Droit has a similar climate.

Parish of Gonaïves.—The rainfall is very irregular, and the parish suffers from both floods and drought. In 1733 a flood inundated the whole plain. In 1744 there was a considerable drought. In the night of August 4–5, 1772, Gonaïves was visited by a gale which did damage in all the northern part of the colony. In February, 1777, this parish had not had rain for eleven months, and for seven months the river had been dried up. In the plain of Gonaïves are to be seen the evidences of a dry climate, cactus growing abundantly, etc.

Artibonite plain and river.—There are generally two regular seasons, the dry and the rainy. The former commences with the month of November and lasts to the middle of May; the latter comprises the rest of the year. The dry season is generally rainless; if rains occur they presage a late rainy season. The arrival of the rainy season is announced in April or May by thunder and rains in the mountains in the late afternoon; these gradually move from east to west, advancing into the plain.

The plain does not all have a similar rainfall. From the village of Verrettes to that of Petite-Rivière the rains are more abundant and earlier than elsewhere in the plain. From Petite-Rivière for a distance of three and a half leagues down the valley the rains are more frequent and of longer duration than in the lower part of the plain.

It is a curious fact that at Artibonite rain falls only in the afternoon, after 3 o'clock. The sky is clear every morning, but, in the rainy season, becomes overcast between 3 and 5 p. m. Distant thunder is heard; the west wind falls; and an east wind springs up, bringing with it a gentle and beneficent rain, which, however, is sometimes replaced by disastrous downpours. The end of the rainy season is announced by rains without thunder, lasting sometimes for days together.

The regular succession of the dry and the rainy seasons is sometimes interrupted by destructive droughts or freshets.

Parish of Saint Marc.—The climate is generally dry, but varies with the locality. In the section bounded on the east by the road from the Ester River to the lower ferry, on the north by the Ester, on the west by the ocean, and on the south by the Artibonite, this dryness is extreme. The earlier summer thunderstorms, coming from the east, do not reach this locality. Three or four heavy thunderstorms, preceded by very dusty wind-squalls, occur in the period from June to September, and this constitutes the whole rainfall of the year. This region is called "l'Étable."

The corresponding district on the left bank of the Artibonite has a climate similar, but a little less dry. The mountains extending to Point Saint-Marc are extremely dry. It is in the direction of Montrouis, however, that the lack of rain is most

[7] The writer enlarges upon this alleged recurving of the trade wind, explaining that the easterly current, having skirted the mountainous north and south coasts, after reaching the headlands of Môle St. Nicolas and Tiburon, "feels the effect of the sort of rarefaction produced in the intervening space where the mountains of the eastern frontier have impeded its passage," and sweeps into the Gulf of Gonaïves, giving westerly winds to the west coast. Probably the real explanation of the westerly winds on this coast (so far as they exist) is that they are merely the normal diurnal sea breeze, which, thanks to the barrier of mountains to the eastward, is not suppressed by the trades. An inspection of the daily observations at Port au Prince by Scherer, published in the Vienna Jahrbücher, shows that the wind at that station is almost invariably from the eastern quadrant at the morning (7 a. m.) observation, but has shifted to a westerly direction by the time of the midday observation (1 p. m.).

severely felt. When I visited there in April, 1783, only three showers had occurred in twenty months. Generally no rain falls before June, and sometimes none before July.

At Saint Marc a westerly sea breeze prevails by day, alternating with a land breeze from the northeast.

Parish of Mirebalais.—The climate is generally dry. As the parish is surrounded by mountains there is very little wind. Fogs are common. The heat is great, owing to the soil, but cool nights prevail.

Parish of Arcahaye.—As in the case of the other districts lying west of the frontier mountain range, the climate of Arcahaye is generally dry for six months of the year. The rains begin at the end of April or the beginning of May and end toward the middle of October. The sea breeze is west, and the land breeze northeast.

On May 30, 1786, toward 4:30 p. m., hail fell at Boucassin, lasting half an hour. The smallest hailstones were the size of pistol balls, the largest as big as pigeon eggs. On May 1, 1787, at 2:15 p. m., a violent windstorm began in the canton of Fond-Baptiste, accompanied by rain and hailstones as large as those of 1786. The rain and hail lasted 25 minutes, at the end of which time there were two inches of hail on the ground. The temperature at the beginning of this storm was 15° R. [19° C.]. The coffee plants were much damaged by this storm, as also by that of April 16, 1788.

Sugar cane can not be cultivated without irrigation, as the rainfall is not sufficient.

Parish of Croix des Bouquets.—The climate is dry. There is generally no rain from October to about the middle of April, except during the prevalence, for four or five days, of a north or south wind, when a steady, fine rain falls. This rarely happens more than two or three times during the six months. These north and south winds are the only ones that give rain in the morning. Mild and agreeable weather prevails during this period. During a north wind of March 12 and 13, 1788, the temperature fell to 9° R. [11° C.] at Pays-Pourri.

More or less rain falls during the other six months—sometimes every day, and sometimes only every eight or ten days, and generally between 4 and 10 p. m. There have been years—notably 1750 and 1751—when this season was rainless. The rains are accompanied by wind squalls, and fall with a violence known only to the Tropics. All the water courses become torrents, and the Grande River causes destruction to life and property. The floods are of short duration, however, thanks to the inclination of the watershed and the comparatively straight course of the streams in this section.

Toward the middle of June the rains cease for three or four weeks, this period being called "St. John's summer" ("l'Eté de St. Jean"). At the end of this period the rains recommence, occurring nearly every afternoon, and are now accompanied by violent thunder and lightning, which seem to reach their maximum intensity in September and October.

According to observations made on a plantation situated one league northwest of Croix des Bouquets there were, in 1785, 62 rainy days, and a total rainfall of 35 inches, 9¾ lines [969 mm.]; in 1786, 44 rainy days, and a rainfall of 28 inches [758 mm.].

Hail fell on August 12, 1789, the stones ranging from the size of a hazelnut to that of a pigeon's egg. Twelve hailstones, taken up at random, were exposed in a vessel, in the open air, for an hour and a quarter before melting.

During the six months of the dry season the winds are pretty regular. The land breeze, blowing between northeast and southeast, prevails normally from 10 p. m., to 10 a. m., the sea breeze, coming from the west, blows during the remaining hours. This exact division is not common, however; the land breeze sometimes blows until 1 p. m. During the other six months the west wind sometimes fails for three successive weeks. The wind blows violently from the east, withering and drying up everything. The air is filled with a penetrating dust. Sometimes, however, the west wind, instead of dying away in the evening, increases in force and blows strongly until daybreak.

It is generally between the period of St. John's summer and the month of September that terrible storms, amounting to small hurricanes, occur in this region, coming from the east or southeast, and laying low the sugar cane, uprooting trees, and overturning or unroofing the buildings.

One of these storms occurred July 6, 1751. It began about 8:30 p. m. with a northeast wind, which became furious at 9 p. m. The parsonage of Cul-de Sac and the buildings belonging to it were all unroofed, and the large trees of the neighborhood were uprooted. Great damage was done in the cane fields. Fires broke out at several points where cabins were thrown down. The wind diminished at 9:30. On September 20 of the same year a similar hurricane occurred, doing equal damage.

On August 16, 1788, occurred a terrible hurricane, which blew down houses, cabins, and barns, destroyed crops, and buried negroes beneath the ruins of their homes. In the mountains many of these unfortunates died of cold and exposure.

This parish has suffered severely from earthquakes, especially from the terrible earthquake of 1770.

The parish of Croix des Bouquets and the plain of Cul-de-Sac are considered to have a healthful climate. Generally the breeze tempers the heat. When, however, the easterly winds become vehement and (to use a Santo Domingan expression) "*carabinées,*" one is obliged to remain indoors to escape their violence; the air becomes dry and renders respiration painful, and all objects become hot to the touch.

Parish of Port au Prince. The division into dry and rainy seasons is in general the same as in the parish of Croix des Bouquets, but is subject to variations. From the beginning of November, 1768, to February 10, 1769, there were but fifteen days without rain. Some of the showers were very heavy and accompanied by thunder, and north and west winds were very frequent.

The temperature varies with the location. That of the town of Port au Prince ranges between 14° and 32° R. [17½° and 40° C.]. In the canton of Nouvelle-Touraine, at the foot of Mount La Selle, the temperature fell on the 12th and 13th of March, 1788, during a north wind, to 5½° R. [7° C.].

From November, 1785, to May 5, 1786, a desolating drought prevailed.

According to the observations of M. Mozard the rainfall at Port au Prince (the town) during 1786 was 32 inches 10¼ lines [889 mm.], and during the first six months of 1787, 19 inches 1⅛ lines [517 mm.].

Large hailstones fell in the town on March 13, 1778, during a thunderstorm.

There are few towns in which lightning so frequently strikes as at Port au Prince. [The writer gives details of several cases.] The use of lightning-rods was begun here in 1787. During a severe thunderstorm on October 6, 1789, the lightning, which struck in two places, is thought to have *ascended* instead of descending.[8]

The hurricane of July 6, 1751, mentioned in connection with the climate of Croix des Bouquets, also raged at Port au Prince, unroofing houses and doing other damage. Destructive storms occurred also May 23, 1771, and August 26–28, 1785. The most memorable storm, however, was that of Saturday, August 16, 1788. Rain fell in the morning—a rare occurrence at Port

[8] The phenomenon of ascending lightning is referred to by many early writers. The Abbé Cotte cites a passage from Pliny to prove that it was observed by the ancients: *Etruria erumpere terrâ quoque fulmina arbitratur.* (Hist. Natur. lib. II, cap. LII.)

au Prince. The wind at the beginning of the storm varied between north-northwest and north; at 6 o'clock it shifted to east-northeast, blowing with extreme violence for three and one-half hours, and varying to east-southeast. During this period one-tenth of the houses were partially or entirely unroofed, and many were blown down, among the latter a cabin 180 feet long, in which were lodged the negroes belonging to the government. Many elm trees were uprooted. The greatest damage was done in the harbor, where many vessels were driven ashore and some were sunk, many lives being lost. On the 18th 60 bodies, of whites and negroes, were counted on the shore. The barometer at noon of the 15th read 28 inches 1 line [760.2 mm.]; at 10 p. m., 27 inches 11½ lines [756.8 mm.]; at 7 a. m. of the 16th, 27 inches 7½ lines [747.8 mm.]. At 10:30 of the 16th it had risen to 27 inches 9 lines [751.2 mm.]. The temperature remained during the storm at 17° R. [21° C.]. On the 16th 23 lines [52 mm.] of rain fell.

The storms experienced in the southern part of the island, which sometimes extend their ravages to the western gulf [Gulf of Gonaïves], are evidently due to the same cause as the hurricanes of the Lesser Antilles, since they occur at the same season and have a similar character, differing only in intensity. This cause, hitherto unexplained, seems to upset all theories by its singular effects, among them being the tortuous direction which the wind sometimes follows.

[The violent east winds, or "brises carabinées," experienced at Port au Prince and Cul-de-Sac, which are strongest during the period from May to October, are explained as due to the concentration of the trade winds in passing through the narrow passes of the frontier chain. The writer describes in detail the topographic features producing this effect.

Interesting particulars are given of the disastrous earthquakes with which this part of the island has been afflicted.]

Parish of Léogane.—The climate varies with the locality, as in other parishes. In the plain the winds are not so regular as at the Cape nor even as at Port au Prince. The mountains often intercept the east wind, which is dry, but cool, and which, when it blows at sunrise, indicates a fine day. The westerly or sea breeze often fails. The northerly winds, when they incline to the east, are cold and rainy; when they shift toward the west, hot and stormy (*orageux*). The southerly winds are hot and dry.

In the coolest weather the temperature is 16° R. [20° C.] in the morning, 20° R. [25° C.] at midday, and 18° R. [22½° C.] in the evening; in the hottest weather, 23° R. [29° C.] in the morning, 28° R. [35° C.] in the afternoon, and 24° R. [30 °C.] in the evening. In the mountains the nights are cold enough to require the use of warm bed coverings, and open fires are enjoyed in the evening.

The annual rainfall of the plain of Léogane, calculated by M. Baussan, from observations for the 20 years 1761–1780, inclusive, is about 50 inches [1354 mm.]. The dryest year was 1769, with 38 inches 10 lines [1051 mm.], and the wettest 1765, with 61 inches 7 lines [1667 mm.]. The rainy season is the same as at Cul-de-Sac, viz, from the middle of April to the middle of October. April and September are generally the rainiest months; December, January, and February the dryest.

The most severe thunderstorms are brought by the west wind. They are also those which occur latest in the day.

A disastrous flood occurred in October, 1716. It was followed by malignant fevers, which claimed many victims among recent arrivals in the island. Another inundation occurred July 24, 1724.

A windstorm during the month of September, 1741, destroyed the cane and indigo. Other more or less destructive storms occurred during the night of September 24–25, 1741; on August 2, 1765 (when 74 lines [167 mm.] of rain fell in 24 hours); on October 15, 1780; and on August 16, 1788.

Tidal waves sometimes occur on the coast.

Lightning frequently strikes in the vicinity of the town and in the harbor of Léogane. This happened ten times in 1765.

An aurora borealis was observed at Léogane July 28, 1780, from 7 to 8 p. m.

Parish of Grand-Goave.—The climate is dry and healthful. Destructive floods, however, occurred October 26–27, 1716, and July 24, 1724. Severe windstorms occurred September 24, 1741, and in September, 1756.

Parish of Cayes de Jacmel.—The climate is dry. In the cantons of Sale-Trou and Cap-Rouge it is necessary to use cisterns to prevent the water supply from failing during the long droughts. The seasons are the same as at Croix des Bouquets. The day breeze is easterly, the night breeze northerly. The former is deprived of its moisture in its passage over the frontier chain, and it is observed that the climate is drier the nearer one approaches this chain. The high Mount La Selle also catches the moisture borne by winds from the direction in which it lies. Like the rest of the southern coast, this parish suffers from southerly gales. They have occurred July 24, 1724; September 21, 1751; September 16, 1754; September 5, 1781; August 26, 1785; August 16, 1788.

Parish of Jacmel.—The climate, which has periods similar to those of Cayes de Jacmel, must be considered a dry one. The day breeze, which is strong, comes from the east-southeast and the night breeze from northwest. Southerly gales are experienced; those mentioned in connection with Cayes de Jacmel were also destructive in Jacmel.

Hail fell during a thunderstorm in July, 1774.

A severe drought, followed by a visitation of caterpillars, occurred in 1764.

Parish of Bainet.—Bainet is subject to severe droughts, and to gales from the south. Of the latter, those of September 21, 1751, and September 5, 1781, are especially mentioned.

SOUTHERN PART.

The climate is less dry than that of the western part. The east wind prevails by day, and it has not the dessicating character of the "brises carabinées" of Cul-de-Sac. The north side feels the influence of the norths, which, however, become dry and scorching by the time they have crossed the mountain ridge to reach the southern side. The latter side suffers from disastrous winds, between east-southeast and west-southwest, occurring between July 15 and October 15; they are much less severely felt on the north side. The southerly winds are always rainy.

Parish of Petit-Goave.—The climate is quite similar to that of Léogane. Meteorological observations were made at Petit-Goave by the celebrated expedition which the French Academy of Sciences sent out to Peru to measure an arc of meridian. In September, 1735, M. Godin, of this expedition, observed a temperature of 23° R. [29° C.] in the morning and 27° R. [34° C.] during the day.

Petit-Goave experienced a furious hurricane August 14, 1680. Other hurricanes occurred in September, 1756, on August 2, 1765, and August 4, 1772, the last following a very severe drought. Many disastrous floods have occurred here.

Parish of Fond-des-Nègres.—The climate varies with the location. Rain fell on 102 days in 1779, 105 in 1780, 114 in 1781, 85 in 1782, 95 in 1783, 115 in the first nine months of 1784, and 97 in the first six months of 1785, indicating on the average half again as much rainy weather as at Léogane. The wind storm of September 9, 1737, did much damage.

Parish of Anse-à-Veau.—The climate is subject to great vicissitudes. Although the average annual rainfall is 80 to 90 inches [2166 to 2436 mm.], droughts sometimes occur, and on the other hand the annual rainfall sometimes amounts to 120 inches [3248 mm.]. This parish receives rain from the norths. These were quite heavy in 1685.

Parish of Acquin.—The climate is very dry. The years 1726, 1781, and 1782 are especially memorable in this respect. In

the last-named year neither sweet potatoes nor maize could be raised. There was a flood September 6, 1754. The sea breeze is generally east-southeast, and the land breeze northeast. Destructive windstorms occur; that of September 9, 1737, did not leave a single house standing, while that of 1783 also caused much damage.

Parish of St. Louis.—The sea breeze here is east-southeast to southeast; the land breeze northeast. The latter is strong, on account of following a chain of mountains and gorges.

September 26 and 27, 1716, there was a flood and a destructive windstorm. On September 9, 1737, at 2 p. m., the wind shifted from north to northwest, later it passed to south, southwest, and finally to the west, from which quarter it was most violent. All the houses were unroofed and many were blown down. Seven of the ten vessels in port went aground; two vessels sank, with a loss of fourteen lives. A violent hurricane occurred in the night of September 24–25, 1741, and another in the night of September 21–22, 1751. A gale occurred in the night of September 16–17, 1754. A north wind, which began March 8, 1788, continued with increasing force for six days, becoming destructive to the crops. In March, 1721, no rain had fallen at St. Louis for eight months.

Parish of Cavaillon.—The sea breeze is from the east, the land breeze from northwest or west-northwest. The gale of September 9, 1737, did much damage. During the winter months fogs occur in the lowlands in the morning, especially in the canton of Mal-Fini.

According to observations made on a plantation in the upper part of the plain of Cavaillon, the mean annual rainfall from 1780 to 1785, inclusive, was 76½ inches [2071 mm.]. The rainfall of 1782 was but 42 inches 10 lines [1160 mm.]; that of 1784 was 120 inches 9 lines [3269 mm.]. A severe flood occurred in 1761. In the hurricane of August 16, 1788, there fell in the gorge of Cavaillon, in 24 hours, 14 inches 5 lines [390 mm.] of rain.

Parish of Cayes.—There are two well-marked seasons, the rainy season from April to October and the dry season from October to April. The former begins with distant thunderstorms, which draw nearer and grow more frequent with the advancing season. The abundant rains come on toward the middle of May, and continue during July and August. The periods of great heat occur in August and September; then thunderstorms, sometimes very rainy, reappear, but gradually become distant, and the dry season sets in. The thunderstorms almost always come from the east, and generally break over the town, so that often points seven or eight hundred toises [about a mile] outside its borders receive no rain. The rains come from the same quarter, but in July and August all the winds are rainy. The mean annual rainfall is 70 to 75 inches [1895–2030 mm.].

The air is refreshed by the alternate land and sea breezes. The former are east-southeast and southeast; the latter north or northwest. From September to March the north winds are quite cold.

Hurricanes raged here in 1680; September 21–22, 1751; September 17–22, 1754; September, 1756; August 4–5, 1772; August 27–28, 1775; August 16–17, 1788. [That of 1754 appears to have been the most destructive on sea and shore, and was a typical West Indian hurricane. It began with a heavy swell on the morning of September 17. The shift of the wind was from north through northeast to east-southeast. Many vessels were stranded and six persons were drowned.]

Parish of Torbec.—The climate is very similar to that of Cayes. In the canton of Platons the temperature does not rise above 23° R. [29° C.].

Parish of Port-Salut.—The climate is dry. The water supply depends upon wells, and even these are likely to dry up, unless located near the sea or the small water courses.

Parish of Côteaux.—The climate is dry and becomes more so each year. In 1785 all the crops were destroyed by drought. On the other hand, a destructive freshet occurred in September, 1772. The sea breeze is east-southeast to east; the land breeze northeast. The dry season is generally from December to July.

Parish of Tiburon.—The climate is mild. The temperature does not rise above 22° R. [27½° C.], and falls to 17° R. [21° C.]. The annual rainfall is about 100 inches [2707 mm.]. The land breeze is strong and regular; it blows from north or northwest, and lasts until 8 a. m. The sea breeze is east to southeast.

Parish of Dalmarie.—From Irois to Dalmarie the day breeze is northwest and the night breeze southeast. The true norths bring rain, but the northeast winds are dry.

Parish of Jérémie.—The climate is generally healthful. The temperature hardly ever exceeds 24° R. [30° C.], even in exposed places near the sea. Caïmites has a climate intermediate between that of the coast and that of the high mountains. Plymouth is cold compared with the rest of the parish; its elevation, its proximity to high mountains, its northern exposure and the frequency of rain all conspire to diminish the temperature, which, however, may rise to 23° R. [29° C.] in July and August; in December it descends to 10° R. [12½° C.], which is extreme for Santo Domingo. In general, during the fine days of the winter months one might think one's self in France in the month of May.

The prevailing winds at Jérémie are north-northeast by day, and southeast to south at night. The norths are felt here, not only in their proper season, which is from October to April, but also in other months. They sometimes come very suddenly and are always dangerous to vessels. Their force redoubles about 3 or 4 p. m., and remains the same until 9 or 10 p. m., after which it diminishes.

In the thunderstorm season occur what are called *hourvari* or *hourlevari*. These are violent winds which spring up suddenly, sometimes succeeding a dead calm. The wind uproots trees, unroofs houses, and would cause general destruction if its duration were not limited to from a quarter to half an hour. This wind is the beginning of a thunderstorm.

Destructive hurricanes occurred September 4–5, 1772, August 27, 1775, and September 5, 1781.

Jérémie has plentiful rains, some of which it owes to the norths. The mean annual fall is about 90 inches [2436 mm.]. During the hurricanes the fall is sometimes so great as to cause the rivers to rise 20 to 25 feet. The rainfall at Plymouth during the first six months of 1783 was 70 inches 7½ lines [1912 mm.]; during 1784 it was 166 inches 1½ lines [4497 mm.].

From Carcasses, in the parish of Tiburon, to Jérémie there is rarely any rain late in the day, except after a *hourvari*.

Thunder is neither frequent nor of long duration in this parish. Mount La Hotte seems to draw the clouds to itself, and the electrical storms seem to be concentrated upon this elevated spot.

To complete the survey of Haitian meteorology in the eighteenth century a résumé is given below of additional material found in Cotte's "Mémoires sur la météorologie" (Paris, 1788), and in a work entitled "Voyage d'un Suisse dans différentes colonies d'Amérique pendant la dernière guerre" published anonymously by Justin Girod-Chantrans (Neuchatel, 1785). These two works, with that of Moreau de St. Méry, are believed to exhaust the sources of information now extant regarding systematic meteorological observations in Haiti in the eighteenth century, unless the missing second volume of the memoirs of the Cercle des Philadelphes should come to light. The latter work is not to be found in the library of the Collège St. Martial, at Port au Prince—the largest collection in

Haiti of works relating to the former colony—nor in the library of the American Philosophical Society, at Philadelphia, though both of these libraries contain the first volume.

Cotte's "Mémoires", Tome II, includes results from the following stations:

Station.	Latitude.	Observer.
	° ′	
Camp-de-Louise	19 42	Thomas.
Le Cap	19 45	Chabaud.
Léogane	19 52	
Tivoli	18 35	Lefebure des Hayes.

The results for Léogane are copied from Les Affiches Américaines (a colonial newspaper) of October 9, 1784. The name of the observer is not given.

The following are brief abstracts of the text and tables in Cotte's work:

Camp-de-Louise.—The plantation of M. de Ladebat, on which the observations were made, is on the north coast of the island, some leagues from Cap Français. There are mountains to the west and south [of Cap Français. The location of the station with respect to the town is not stated]. For the period June, 1775–September, 1776, the highest temperature was 26.2° R. [32.8° C.]; lowest, 16.5° R. [20.6° C.]; mean daily (from terdaily observations), 20.1° R. [25.1° C.]; highest barometer, 28 inches, $4\frac{4}{12}$ lines [767.7 mm.]; lowest, 28 inches, 0 line [758.0 mm.]; mean (from terdaily observations), 28 inches, $2\frac{1}{12}$ lines [762.7 mm.]; number of days with rain, 110; number of days with thunder, 27.

Cap [9] [i. e., Cap Français, now Cap Haïtien]. Rainfall:

1783.			1784.		
Months.	Inches, lines.	Millimeters.	Months.	Inches, lines.	Millimeters.
April	15 5	[417]	January	35 10	[970]
May	24 11	[647]	February	28 6	[772]
June	3 4	[90]	March	12 0	[325]
July	16 0	[433]	April	0 3	[7]
September	12 4	[334]	May	46 7	[1261]
November	51 4	[1390]			
December	15 0	[406]			

Léogane.—Twenty years' observations (1761–1780) on a plantation near the town. Mean annual rainfall, 49.85 inches [1349 mm.]. Mean number of days with rain in the year, 99. Rain fell more often at night than by day. Heaviest rainfall accompanying a thunderstorm (duration not stated), 5 inches 6 lines [149 mm.]. During the hottest weather the temperature was 23° R. [29° C.] in the morning, 27°, rarely 28° R. [34°–35° C.] in the afternoon, and 24° R. [30° C.] in the evening. During the coldest weather the temperature was 16° R. [20° C.] in the morning, 20° R. [25° C.] in the afternoon, and 18° R. [22½° C.] in the evening. Hence he deduces a mean annual temperature of about 21° R. [26° C.].

Tivoli.—This was the name of the private estate of the Chevalier des Hayes, situated in the parish of Jérémie and the canton of Plymouth, in a valley 221 toises [431 meters] above sea level. Regular observations were made during the years 1772–1782, inclusive, but a part of the results failed to reach the Abbé Cotte, who, in his computations, used only the years 1772 and 1774, the first five months of 1775, the last seven months of 1778, and the years 1779, 1781, and 1782.[10] From the tables published by Cotte it appears that the mean annual rainfall at Tivoli during the years 1781 and 1782 was about 101 inches [2734 mm.], and the average number of days with rain 138. The mean annual pressure was 26 inches $7\frac{5}{12}$ lines [720.6 mm.]. Cotte rejects the observer's record of temperature, on account of the faulty exposure of his thermometers.

[Cf. Moreau de St. Méry's figures for the rainfall of this canton in 1783 and 1784, under "Parish of Jérémie," above].

The "Voyage d'un Suisse" (see above) contains the abstract of a meteorological journal kept "aux environs du Cap" from May 24, 1782, to the end of April 1783—covering therefore about a year. Observations were made regularly four times a day; viz., at 7 a. m., noon, 3 p. m., and 7 p. m.; the means and extremes of pressure and the means and maxima of temperature being deduced therefrom. The minima of temperature were obtained from an extra observation of the thermometer made immediately before sunrise. The pressure is reduced to sea level.

In the accompanying Table 1 the original figures for the pressure have been converted from French inches and lines to millimeters, and those for the temperature from the Réaumur to the centigrade scale. The last column gives the corrected or true daily means of the temperature, obtained from the means of the observations by the use of corrections derived from Hann's values for the diurnal variation at Port au Prince.[11] The mean of readings at 7 a. m., noon, 3 p. m. and 7 p. m., is 1.5° higher, on an average, than the true daily mean. The greatest departure is +1.8° in July; the least +1.3 in December.

TABLE 1.—*Meteorological observations made in the vicinity of Cap Français, island of Santo Domingo.*

	Pressure.			Temperature.			
	Highest.	Lowest.	Mean.	Highest.	Lowest.	Mean.	Corrected mean.
1782.	*mm.*	*mm.*	*mm.*	° *C.*	° *C.*	° *C.*	° *C.*
May 24–31	763.0	760.2	761.7	31.9	23.8	29.5	27.9
June	765.3	760.2	763.6	32.5	23.1	28.9	27.3
July	764.2	759.6	762.1	33.4	23.8	29.5	27.7
August	762.8	759.5	761.3	33.1	23.8	30.0	28.3
September	763.0	758.3	760.6	33.4	22.5	28.6	27.0
October	764.7	756.3	760.2	30.9	22.5	27.8	26.4
November	764.7	758.5	761.7	30.6	19.2	25.9	24.5
December	764.2	759.8	762.5	28.4	18.8	25.0	23.7
1783.							
January	766.6	761.0	763.4	28.4	19.1	25.9	24.5
February	767.5	762.1	765.5	28.8	20.0	25.9	24.3
March	767.7	762.5	764.5	29.1	20.0	25.5	23.9
April	767.5	760.8	763.8	30.6	19.7	25.9	24.2
Year	767.7	756.3	762.6	33.4	18.8	27.4	25.9

MEAN ANNUAL RAIN MAP OF NEW SOUTH WALES.

We have lately received a very neat map showing by isohyetal lines the mean annual rainfall of New South Wales. This map was compiled at the meteorological office of the Sydney Observatory; it is published without accompanying text, and will doubtless be called for and used by thousands. It is limited to the territory of New South Wales, and shows that in general from 8 to 10 inches of rainfall may be expected on the western border of that state, increasing thence eastward, at first slowly and afterwards rapidly, up to 70 inches in the northeast corner and to 34 inches in the southeast corner, with numerous local irregularities as we pass along the eastern coast. The maximum annual rainfalls seem to be 64.20 at Alanora, 59.13 at Lawson, 61.19 at Camden Haven, 59.41 at St. Georges Head, 65.71 at Woolkoolga, and 77.70 at Callbyron. According to a footnote on this map, these and similar station means are computed from all yearly records available, generally covering a period of from 20 to 40 years. It is, however, very important that a rainfall map should uniformly represent some fundamental interval of time, so that all the data may be strictly comparable throughout the whole map. The reduction of a short series or a long series to such a fundamental interval is done as shown on page 216 of the MONTHLY WEATHER REVIEW for April, 1902.

[9] These observations at Cap Français are rejected as "entièrement fausses" by Alexandre Moreau de Jonnès in his "Histoire physique des Antilles Françaises" (Paris, 1822), p. 300.

[10] Some of the same data, together with portions of the record not used in Cotte's "Mémoires," were published in the Histoire de la Société royale de Médicine. (Paris, 1779, etc.)

[11] Hann, J. Der tägliche Gang der Temperatur in der inneren Tropenzone. Wien. 1905, p. 33.

STUDIES ON THE THERMODYNAMICS OF THE ATMOSPHERE.

II.—COORDINATION OF THE VELOCITY, TEMPERATURE, AND PRESSURE IN THE CYCLONES AND ANTICYCLONES OF EUROPE AND NORTH AMERICA.

By Prof. FRANK H. BIGELOW.

THE ADOPTED MEAN TEMPERATURES AND GRADIENTS ON THE 1000-METER LEVELS FOR AMERICAN AND EUROPEAN CYCLONES AND ANTICYCLONES.

In order that we may have a suitable example for discussion in the application of the thermodynamic formulæ to the atmosphere, it will be profitable to adopt an average system of temperature distributions in cyclones and anticyclones, derived from the observations that have been made available by the computations of the preceding paper of this series. The practical difficulty of securing, by numerous ascensions at the same time, a sufficiently large number of accurate simultaneous observations in the several subareas around the barometric centers, for all the levels required up to 10,000 meters, is very great when one special temperature disturbance is to be observed, as in an individual storm. It would be desirable to make numerous simultaneous ascensions from different points of the same cyclone, as has been done in Europe, if it is possible to do so from many stations, say for 25 to 40 in number, but the result will then be to give the conditions in only one case, and it would of course require many similar groups of such ascensions to enable us to secure what may be accepted as the average or normal type of cyclonic temperature distribution. Repeated ascensions at a single station, where the facilities for the work are generally much more adequately elaborated, accomplish the same purpose by allowing the kites to remain aloft, and thus permitting the cyclone to drift past the instruments which register the varying changes of temperature, pressure, humidity, and wind velocity. By utilizing the numerous ascensions of kites and balloons made at Hald, Berlin, and Blue Hill, we can secure the approximate normal or average state of the temperatures with which to explain and test the proposed thermodynamic system. Owing to the incompleteness of our available data, it is necessary to assume some extensions of the probable temperatures beyond the actual observations, but it can be done without bringing into doubt the main principles involved in this discussion. The further acquisition of observed data by work in the future will correct any numerical errors that may now arise from this procedure. In order to establish the theory of the energy of storms which I have proposed, it seems proper to use the best available data in these preliminary computations, rather than wait for more completely satisfactory compilations of temperature observations. It will, also, facilitate a correct interpretation of the results of future balloon and kite ascensions, if we can show that our theory is capable of suitably explaining the present adopted mean system of temperature distributions in cyclones and anticyclones. We can infer from the preceding paper that the American and European observations at the three given stations in the lower levels approach so closely together in their numerical details on the 4000-meter level, that we shall be justified in adopting the European observations above 4000 meters as a fair representation of the conditions in the North American atmosphere, which, however, remains to be practically explored in the higher levels.

In order to concentrate the work of computation which will follow, we extract from Tables 1, 2, 3, 4, the temperatures, T, in centigrade degrees, for the several 1000-meter levels, as given in the last column of each quadrant. These temperatures appear in the left-hand section of Tables 9 and 10, which give the temperatures and variations of temperature on each 1000-meter level in American and European cyclones and anticyclones for the winter and for the summer. It should be noted that we have been obliged to introduce certain values for the north quadrant in the American data, because direct observations are entirely lacking, except in the winter high areas. The values here adopted have been the outcome of considerable labor, and they may be found to need some modification as the result of other direct observations. I have been guided in the determination of the interpolated temperatures by three different considerations, (1) the relations of the center areas to the north areas in general, (2) the comparison of the European data with the American, and finally, (3) the balance of the entire system, consisting of the four sectors of the high areas and the four sectors of the low areas taken in connection with the mean temperatures and gradients of the atmosphere without regard to any cyclonic disturbances. Thus, having adopted the mean temperatures and gradients of Table 11 and the mean variations in seven sectors of Table 9, it is easy to compute the variation in any missing quadrant, as the north. A complete balance must evidently be maintained, because the sum of the excess and defect of the temperatures in the several areas on a given level of the cyclone and anticyclone at any elevation, as 1000 meters, 2000 meters, etc., must be equal to zero. However, in these papers, as we are concerned only with approximate relative disturbances of the temperature, and since individual cyclonic disturbances differ widely from any normal type that may be adopted, such interpolations may be admitted for the purpose of discussion.

TABLE 9.—*Temperatures and variations of temperature on each 1000-meter level in American cyclones and anticyclones.*

AMERICAN WINTER HIGH AREAS.—From Table 1.

Height in meters.	Temperatures T. N.	E.	S.	W.	Means, T.	Variations $-\Delta T$. N.	E.	S.	W.	Mean $-\Delta T$.
	°C.	°C.	°C.	°C.	°C.	°C.	°C.	°C.	°C.	°C.
6000	.....	.....	.....	.....	−26.0	.....	.....	.....	.....	....
5000	.....	.....	.....	.....	−19.5	.....	.....	.....	.....	....
4000	− 7.9	−18.8	−17.9	− 7.6	−14.0	+ 6.1	− 4.8	− 3.9	+ 6.4	....
3000	− 3.9	−12.7	−12.6	− 3.1	− 9.0	+ 5.1	− 3.7	− 3.6	+ 5.9	....
2000	− 1.2	− 7.1	− 8.3	1.0	− 4.8	+ 3.6	− 2.3	− 3.5	+ 5.8	....
1000	1.8	− 3.5	− 3.6	4.5	− 1.5	+ 3.3	− 2.0	− 2.1	+ 6.0	....
0	3.7	2.0	− 0.7	9.0	2.8	+ 0.9	− 0.8	− 3.5	+ 6.2	...

AMERICAN WINTER LOW AREAS.—From Table 1.

6000	.....	.....	.....	.....	−26.0	.....	.....	.....	.....	....
5000	.....	.....	.....	.....	−19.5	.....	.....	.....	.....	....
4000	(−12.0)	−13.2	−18.7	−16.0	−14.0	+ 2.0	+ 0.8	− 4.7	− 2.0	3.84
3000	(− 7.0)	− 8.1	−12.6	−11.6	− 9.0	+ 2.0	+ 0.9	− 3.6	− 2.6	3.43
2000	(− 2.0)	− 3.0	− 6.3	− 7.8	− 4.8	+ 2.8	+ 1.8	− 1.5	− 3.0	3.04
1000	(− 2.0)	− 2.7	− 0.1	− 6.8	− 1.5	− 0.5	− 1.2	+ 1.4	− 5.3	2.73
0	(2.0)	2.8	6.3	− 2.7	2.8	− 0.8	0.0	+ 3.5	− 5.5	2.65
									Mean	3.14

AMERICAN SUMMER HIGH AREAS.—From Table 2.

6000	.....	.....	.....	.....	−20.6	.....	.....	.....	.....	....
5000	.....	.....	.....	.....	−14.1	.....	.....	.....	.....	....
4000	− 3.0	− 8.4	− 9.6	− 4.8	− 7.1	+ 4.1	− 1.3	− 2.5	+ 2.3	....
3000	3.6	0.1	− 0.6	2.0	0.4	+ 3.2	− 0.3	− 1.0	+ 1.6	....
2000	9.4	7.1	5.8	8.1	6.4	+ 3.0	+ 0.7	− 0.6	+ 1.7	....
1000	13.6	13.0	11.2	12.1	11.8	+ 1.8	+ 1.2	− 0.6	+ 0.3	....
0	17.9	16.7	14.5	18.1	17.2	+ 0.7	− 0.5	− 2.7	+ 0.9	....

AMERICAN SUMMER LOW AREAS.—From Table 2.

6000	.....	.....	.....	.....	−20.6	.....	.....	.....	.....	....
5000	.....	.....	.....	.....	−14.1	.....	.....	.....	.....	....
4000	−11.4	− 6.0	− 3.6	− 9.0	− 7.1	− 4.3	+ 1.1	+ 3.5	− 1.9	2.63
3000	− 1.4	− 0.3	3.1	− 3.3	0.4	− 1.8	− 0.7	+ 2.7	− 3.7	1.88
2000	4.1	4.8	8.9	3.0	6.4	− 2.3	− 1.6	+ 2.5	− 3.4	1.98
1000	9.5	10.2	16.0	8.8	11.8	− 2.3	− 1.6	+ 4.2	− 3.0	2.00
0	14.7	15.6	23.2	16.9	17.2	− 2.5	− 1.6	+ 6.0	− 0.3	1.53
									Mean	2.00

We next take the mean temperatures of all the high and low areas for the four available systems, the American winter and summer up to 4000 meters, and the European winter and summer up to about 10,000 meters, and set them in the middle column of Tables 9 and 10, as well as in Table 11, the adopted mean temperatures and gradients on the 1000-meter levels for American and European cyclones and anticyclones. It will be seen that at the 4000-meter level the temperatures are almost exactly equal in the two regions, for winter −14.0°

TABLE 10.—*Temperatures and variations of temperature on each 1000-meter level in European cyclones and anticyclones.*

EUROPEAN WINTER HIGH AREAS.—From Table 3.

Height in meters.	Temperatures T. N.	E.	S.	W.	Means. T.	Variations $-\Delta T$. N.	E.	S.	W.	Mean $-\Delta T$.
	°C.	°C.	°C.	°C.	°C.	°C.	°C.	°C.	°C.	°C.
6000	−27.0	−33.2	−24.5	−21.6	−27.4	+ 0.4	− 5.8	+ 2.9	+ 5.8	....
5000	−19.4	−24.0	−18.3	−14.5	−20.4	+ 1.0	− 3.6	+ 2.1	+ 5.9	....
4000	−12.9	−18.0	−12.9	− 8.5	−14.5	+ 1.6	− 3.5	+ 1.6	+ 6.0	....
3000	− 7.6	−13.2	− 7.9	− 3.3	− 9.0	+ 1.4	− 4.2	+ 1.1	+ 5.7	....
2000	− 2.5	− 9.0	− 5.4	0.5	− 4.1	+ 1.6	− 4.9	− 1.3	+ 4.6	....
1000	0.6	− 3.8	− 2.6	2.8	0.3	+ 0.3	− 4.1	− 2.9	+ 2.5	....
0	4.6	0.8	0.8	4.1	4.3	+ 0.3	− 3.5	− 3.5	− 0.2	....

EUROPEAN WINTER LOW AREAS.—From Table 3.

6000	−26.5	−29.6	−27.8	−29.0	−27.4	+ 0.9	− 2.2	− 0.4	− 1.6	2.50
5000	−19.2	−22.4	−21.7	−23.8	−20.4	+ 1.2	− 2.0	− 1.3	− 3.4	2.56
4000	−13.0	−16.0	−15.4	−19.5	−14.5	+ 1.5	− 1.5	− 0.9	− 5.0	2.70
3000	− 6.6	−10.0	−10.0	−13.2	− 9.0	+ 2.4	− 1.0	− 1.0	− 4.2	2.63
2000	− 1.5	− 5.0	− 4.2	− 5.5	− 4.1	+ 2.6	− 0.9	− 0.1	− 1.4	2.18
1000	2.1	1.0	1.4	0.5	0.3	+ 1.8	+ 0.7	+ 1.1	+ 0.2	1.70
0	6.9	4.2	6.6	6.5	4.3	+ 2.6	− 0.1	+ 2.3	+ 2.2	1.83

Mean from 0 to 4000 meters, 2.21

EUROPEAN SUMMER HIGH AREAS.—From Table 4.

6000	−16.7	−24.3	−18.9	−16.7	−19.1	+ 2.4	− 5.2	+ 0.2	+ 2.4	....
5000	−10.6	−17.2	−13.1	−10.2	−13.0	+ 2.4	− 4.2	− 0.1	+ 2.8	....
4000	− 4.8	−11.2	− 7.7	− 4.2	− 7.2	+ 2.4	− 4.0	− 0.5	+ 3.0	....
3000	− 0.4	− 6.5	− 1.7	0.8	− 2.1	+ 1.7	− 4.4	+ 0.4	+ 2.9	....
2000	2.7	− 2.9	2.6	5.9	2.2	+ 0.5	− 5.1	+ 0.4	+ 3.7	....
1000	6.8	3.8	7.4	9.8	8.1	− 1.3	− 4.3	− 0.7	+ 1.7	....
0	13.7	11.3	12.8	14.0	14.1	− 0.4	− 2.8	− 1.3	− 0.1	....

EUROPEAN SUMMER LOW AREAS.—From Table 4.

6000	−13.3	−18.2	−21.9	−23.0	−19.1	+ 5.8	+ 0.9	− 2.8	− 3.9	2.93
5000	− 7.8	−11.6	−16.1	−17.1	−13.0	+ 5.2	+ 1.4	− 3.1	− 4.1	2.91
4000	− 2.8	− 5.9	−10.6	−10.5	− 7.2	+ 4.4	+ 1.3	− 3.4	− 3.3	2.79
3000	2.0	− 0.8	− 5.9	− 4.7	− 2.1	+ 4.1	+ 1.3	− 3.8	− 2.6	2.65
2000	6.4	4.2	− 0.4	− 0.9	2.2	+ 4.2	+ 2.0	− 2.6	− 3.1	2.70
1000	12.5	12.0	5.7	6.7	8.1	+ 4.4	+ 3.9	− 2.4	− 1.4	2.51
0	16.8	17.3	13.5	13.4	14.1	+ 2.7	+ 3.2	− 0.6	− 0.7	1.48

Mean from 0 to 4000 meters, 2.43

TABLE 11.—*Adopted mean temperatures and gradients on the 1000-meter levels for American and European cyclones and anticyclones.*

Height in meters.	Winter. American. T	$\frac{\Delta T}{1000}$	European. T	$\frac{\Delta T}{1000}$	Summer. American. T	$\frac{\Delta T}{1000}$	European. T	$\frac{\Delta T}{1000}$
	°C.	°C.	°C.	°C.	°C.	°C.	°C.	°C.
16000	−73.9		−75.4		−72.2		−71.1	
		−3.5		−3.5		−4.0		−3.0
15000	−70.4		−71.9		−68.2		−68.1	
		−3.0		−3.0		−3.0		−2.5
14000	−67.4		−68.9		−65.2		−65.6	
		−2.5		−2.5		−3.0		−2.5
13000	−64.9		−66.4		−62.2		−63.1	
		−2.0		−2.0		−4.0		−4.0
12000	−62.9		−64.4		−58.2		−59.1	
		−4.0		−4.0		−5.5		−5.5
11000	−58.9		−60.4		−52.7		−53.6	
		−5.5		−5.5		−6.0		−6.5
10000	−53.4		−54.9		−46.7		−47.1	
		−6.5		−6.5		−6.7		−7.0
9000	−46.9		−48.4		−40.0		−40.1	
		−7.1		−7.0		−7.0		−7.5
8000	−39.8		−41.4		−33.0		−32.6	
		−7.0		−7.0		−6.5		−7.0
7000	−32.8		−34.4		−26.5		−25.6	
		−6.8		−7.0		−5.9		−6.5
6000	−26.0		−27.4		−20.6		−19.1	
		−6.5		−7.0		−6.5		−6.1
5000	−19.5		−20.4		−14.1		−13.0	
		−5.5		−5.9		−7.0		−5.8
4000	−14.0		−14.5		− 7.1		− 7.2	
		−5.0		−5.5		−7.5		−5.1
3000	− 9.0		− 9.0		+ 0.4		− 2.1	
		−4.7		−4.9		−6.0		−4.3
2000	− 4.3		− 4.1		+ 6.4		+ 2.2	
		−2.8		−4.4		−5.4		−5.9
1000	− 1.5		+ 0.3		+11.8		+ 8.1	
		−4.3		−4.0		−5.4		−6.0
000	+ 2.8		+ 4.3		+17.2		+14.1	

and −14.5°, and for summer −7.1° and −7.2°, respectively, for America and Europe. This indicates that, after escaping from the confusion in the circulation near the surface, about the same temperatures prevail in the midst of the track of the cyclones and anticyclones in the Northern Hemisphere, that is over Blue Hill, latitude 42°, in the United States, and over Hald, latitude 56°, and Berlin, latitude 52°, in Europe, though the stations are themselves in different latitudes. We can, therefore, admit the European data to apply to the American temperatures above the 4000-meter level, at least approximately.

I have also, in Table 11, extended the temperatures and gradients up to 16,000 meters, using the known temperatures derived from European observations so far as possible in these high elevations, because I wish to secure some tentative values of the pressure, the density, and the gas factor at those altitudes, to be computed by the formula which will be introduced in the following paper of this series. It should be observed that the gradients are smaller in the lower levels than in the middle levels, 4000 to 10,000 meters, and that they are again smaller in the high levels above 10,000 meters. This type of variation in the gradients conforms to the warm zone observed by Teisserenc de Bort at the high levels, his "isothermal" zone, so that there are in the atmosphere two zones of relatively small gradients, the lower near the surface, from 0 to 4000 meters, and the higher above 10,000 meters. In these zones there are rapid alternations in temperature, as compared with the middle zone, showing that mixing currents prevail in these two strata of the atmosphere, the lower, near the surface, being the region where the cyclones and anticyclones are generated by the counterflow of warm and cold currents, and the latter, in the high levels, where the warm air overflowing from the Tropics mixes with cold air from the polar zones. As this is a subject belonging to the general circulation, further discussion of it will be postponed to a later paper. It should also be noted that I have gradually eliminated the annual variation in the temperature in the levels above 4000 meters, which is, I suppose, in agreement with the observed temperatures in the high levels. These adopted data will at least serve as examples, approximate to the truth, for introduction into the thermodynamic discussions to follow.

THE VARIATIONS OF TEMPERATURE IN THE SEVERAL SECTORS OF CYCLONES AND ANTICYCLONES ON EACH 1000-METER LEVEL.

Having derived from numerous direct observations the approximate normal temperatures prevailing in typical cyclones and anticyclones, I proceed to deduce a somewhat better average system of temperatures by the following discussion:

If T_0 is the mean or undisturbed temperature which prevails at a given level, independent of any local cyclonic disturbance, and T the temperature at a given disturbed point, as in the several sectors of the high and low areas, then $T_0 = T + \Delta T$, and $-\Delta T = T - T_0$ is the correction to transpose the mean T_0 into the observed T. Thus, in Table 9, under American winter high areas, at the north sector of the 4000-meter level, the temperature is −7.9°, which is +6.1° warmer than the mean temperature of that level −14.0°, taken over the combined high and low areas of the region. The variations ΔT of the second section of Tables 9 and 10 are, therefore, the corrections to change the mean T_0 to the observed temperature T, in which the sign + means warmer, and the sign − colder than the average temperature T_0. An inspection of these tables will show the prevailing temperature variations in the several quadrants, and a comparison of the American with the European variations up to 4000 meters shows the extent to which the data fail to conform precisely. Allowance must, of course, be made for the fact that Blue Hill is near the ocean on the eastern side of a great continent, and Hald and Berlin on the northwestern side of another continent, so that the permanent masses of air, as the high areas to the northwest of Blue Hill in winter, but to the northeast of Hald and Berlin, or the high area to the southeast of Blue Hill in summer, and to the southwest of Hald and Berlin, must necessarily make

differences as to the temperature configurations of the several quadrants in the American and European systems. We have been proceeding on the assumption that the northern sector of the cyclone contains the "saddle" of pressure described in my papers on the barometric distribution, and while I have found it actually oriented in any one of the four quadrants at different times, yet it is situated to the north of the center in the great majority of instances for the United States.

If the mean variation of ΔT is computed up to 4000 meters, without regard to sign, to show the average relative distortion in the temperature level surfaces, we find for the—

American winter areas, the mean $\Delta T = 3.14$,
American summer areas, the mean $\Delta T = 2.00$,
European winter areas, the mean $\Delta T = 2.21$,
European summer areas, the mean $\Delta T = 2.43$.

The American winter disturbance is 1.57 times that of summer; the European winter disturbance is 0.91 time that of the summer; the American winter disturbance is 1.42 times that of Europe; and the American summer disturbance is 0.82 time that of Europe. On the whole the disturbances of temperature were about the same in each of these districts in the weather conditions when the direct observations made in balloon and kite ascensions were executed. What the relative values are in more strongly developed storms remains to be determined by further investigations.

In order to construct the mean temperature variations, ΔT, adopted in Table 12, we proceeded as follows: The variations of Tables 9 and 10 were plotted on diagrams like fig. 5, the American up to 4000 meters, the European up to 6000 meters, and then lines dividing the warm areas from the cold areas were drawn, the result showing that there is a similar configuration in spite of minor differences. Then the mean values of these two systems were taken, that is, the arithmetical means of the several pairs of American and European values in the same sector, so that the two observed systems were reduced to one system, which made another drawing like fig. 5. The sequence of the numbers in the same sector from the ground up through the several levels, such as appear in Table 12, was then examined, and, on the assumption that the change from one level to another should be gradual, and in harmony with those above and below, it was possible to detect imperfections in the observational data. There were not many important changes necessary to be made, and the final changes can be checked by the reader from Table 13, which is the adopted mean system taken by averaging Tables 9 and 10, together with the occasional minor corrections mentioned. These gradient variations, that is, the ΔT of Table 12, can be checked in the following way: The sum of the variations, ΔT, found on the same level, as 10,000, 9000, etc., should be zero, if the adjustments are relatively perfect. An examination of the check sums shows that they conform sufficiently for our purposes, as already defined. The vertical sequence of the numbers in the several sectors, N., E., S., W., of the high and low areas, winter and summer, now harmonizes so far as minor irregularities in our observational data are concerned, but it will be proper to modify this adopted system whenever suitable evidence of any important inaccuracy can be procured.

We may observe that, generally, the north and west sectors of the winter high areas are warm throughout, the east is cool in the high, and warm in the low, while an inversion of temperature takes place in the south sector. The last sector, to some extent, conforms to Professor Hann's inversion data, but the other sectors do not confirm his view. In the winter low areas the north and east sectors are warm, the west is cool, and the south again inverts. In the summer high areas the east sector is cool, the west is warm, and the north is warm up to 7000 meters, while the south inverts at 5000 meters from cool to warm; in the low areas the north and east sectors are warm, and the south and west sectors are generally cool.

TABLE 12.—*Adopted mean temperature variations, $-\Delta T$, in American and European cyclones and anticyclones,*

WINTER.

Height in meters.	Mean temperature.		High areas, $T - T_0 = -\Delta T$				Low areas, $T - T_0 = -\Delta T$				Check sums.	
	T	$-\Delta T$	N.	E.	S.	W.	N.	E.	S.	W.		
	°C.	°C.	°C.	°C.	°C.	°C.	°C.	°C.	°C.	°C.	°C.	°C.
10000	−54.2		−1.0	−2.0	+0.5	+2.9	+2.2	+3.0	−2.0	−2.8	+ 7.7	− 7.8
		−6.5										
9000	−47.7		−0.5	−2.5	+0.9	+2.4	+2.0	+3.0	−2.2	−3.0	+ 8.3	− 8.2
		−7.1										
8000	−40.6		+0.0	−3.0	+1.3	+3.0	+1.5	+2.7	−2.5	−3.3	+ 8.5	− 8.8
		−7.0										
7000	−33.6		+0.7	−3.5	+1.5	+4.0	+1.2	+2.5	−2.6	−3.5	+ 9.9	− 9.6
		−6.9										
6000	−26.7		+1.4	−4.0	+1.2	+5.0	+1.1	+2.2	−2.8	−3.8	+10.9	−10.6
		−6.7										
5000	−20.0		+2.0	−4.6	0.0	+5.7	+1.2	+2.0	−2.8	−4.0	+10.9	−11.4
		−5.7										
4000	−14.3		+2.8	−4.3	−1.2	+5.6	+1.8	+1.8	−2.4	−3.5	+12.0	−11.4
		−5.3										
3000	− 9.0		+2.7	−4.0	−1.3	+4.8	+2.2	+1.4	−2.3	−3.4	+11.1	−11.0
		−4.8										
2000	− 4.2		+2.0	−3.8	−2.7	+4.0	+2.4	+1.2	−1.3	−3.0	+ 9.6	−10.8
		−3.6										
1000	− 0.6		+1.5	−3.1	−2.5	+3.3	+1.7	+1.3	+1.1	−2.2	+ 8.9	− 7.8
		−4.2										
0	+ 3.6		+0.6	−2.1	−3.5	+2.0	+0.9	+1.1	+2.9	−1.7	+ 7.5	− 7.3

SUMMER.

10000	−46.9		−1.2	−1.5	+0.2	+1.0	+4.8	+1.2	−2.0	−2.5	+ 7.2	− 7.2
		−6.8										
9000	−40.1		−0.6	−2.0	+0.5	+1.5	+4.6	+1.2	−2.3	−2.8	+ 7.8	− 7.7
		−7.3										
8000	−32.8		−0.0	−2.5	+1.0	+1.8	+4.4	+1.0	−2.7	−3.0	+ 8.2	− 8.2
		−6.7										
7000	−26.1		+0.7	−3.0	+1.5	+2.0	+4.2	+1.2	−3.0	−3.2	+ 9.6	− 9.2
		−6.2										
6000	−19.9		+1.4	−3.3	+1.2	+2.4	+4.0	+1.4	−3.0	−3.5	+10.4	− 9.8
		−6.3										
5000	−13.6		+1.9	−3.2	−0.1	+2.8	+3.3	+1.4	−2.7	−3.0	+ 9.4	− 9.0
		−6.4										
4000	− 7.2		+2.3	−3.2	−0.5	+2.2	+2.8	+1.3	−2.0	−2.6	+ 8.6	− 8.3
		−6.3										
3000	− 0.9		+1.9	−2.9	−0.4	+2.0	+2.4	+0.3	−1.0	−2.6	+ 6.6	− 6.9
		−5.2										
2000	+ 4.3		+1.4	−2.2	−0.4	+1.6	+1.9	+0.2	0.0	−2.4	+ 5.1	− 5.0
		−5.7										
1000	+10.0		+0.5	−1.9	−1.2	+1.0	+1.2	+0.4	+1.0	−2.2	+ 4.1	− 5.3
		−5.7										
0	+15.7		+0.2	−1.6	−2.0	+0.4	+0.8	+0.8	+2.8	−1.5	+ 5.0	− 5.1

These facts can be seen plainly on fig. 5, which reproduces the numbers of Table 12 in a graphic form. I have added a few arrows to suggest the probable flow of the cool and warm currents in the several levels. Thus, in the 10,000-meter level the cool current is from the northwest, in the middle levels, as 5000 meters, from the north, and in the lower levels from the northeast. The warm current is generally from the south with a smaller rotation from the southwest through the south to the southeast. I should like, in this connection, to call special attention to figs. 6 and 7 of my paper III: "The observed circulation of the atmosphere in the high and low areas," MONTHLY WEATHER REVIEW, March, 1902, where the results of the work of the Weather Bureau on the circulation during the International Cloud Year, 1896–7, were summarized. The observed vectors and the components which disturb the normal motion of the atmosphere are there given. Two characteristic features were then marked with the letter *A*, one on the northern quadrants of the cyclonic components, and the other on the southern quadrants of the anticyclonic components. *By comparing with fig. 5 of this paper, it will be seen that there is a rotation through about 90°, from the northwest to the northeast in the north quadrant, for both velocity components and for temperature variations in passing from the 10,000-meter levels to the surface; and that the rotation in the south quadrant is less in the respective cases. It is proper to infer that the two systems are mutually interdependent, and that the movement of the circulation is attended by a corresponding variation in the temperature distribution.*

At the time of constructing the chart of the velocity vectors, I was unable to explain its meaning, and as it differed radically from the charts of velocity-motion published by Mr.

Clayton for the Blue Hill observations, and by Professor Hildebrandsson for European observations, it was desirable that some criterion should be found which would indicate which configuration is to be accepted. My charts, as there explained, depended upon an asymmetric temperature structure of the cyclone and anticyclone, while the Clayton–Hildebrandsson charts seemed to favor a symmetrical system, such as Ferrel had assumed to exist in his theoretical discussions. The agreement, however, of these two independent sets of observations, velocity vectors by the Weather Bureau, and temperatures by Blue Hill, Hald and Berlin, would seem to indicate that the asymmetric system of currents must be adopted. While I can not claim that the numerical values of Table 12, and fig. 5, of this paper are entirely correct, it yet seems probable that the prevailing type of the temperature configurations in the several levels has been made out with sufficient definiteness to permit a numerical discussion of the data, with the aid of the thermodynamic equations in connection with the general dynamic equations of motion, such as will be attempted in the other papers of this series.

THE MEAN TEMPERATURE, T, IN CYCLONES AND ANTICYCLONES.

By means of the variations of temperature, ΔT, given in Table 12, using the mean temperatures of the second column, we can find the mean temperatures in each sector, N., E., S., W., of the high and low areas for summer and winter. The result is given in Table 13, mean temperatures, T, in cyclones and anticyclones. The same data are plotted on fig. 6, and lines dividing the warm and cold areas are drawn, which are similar to those in fig. 5. It is not necessary to make any extended remarks about the distribution of temperatures at this point, but the relations can be illustrated by fig. 7, on which the temperatures of Table 13 are suitably plotted for each sector, the dotted lines standing for the warm areas and the full lines for the cool areas. The scale of the temperature abscissas is smaller than in figs. 3 and 4 of the preceding paper, in order to extend the elevation to 10,000 meters instead of 6000 meters.

From Table 13 we can obtain the temperature falls in 1000 meters for each sector by subtracting the successive temperatures, and such temperature falls per 1000 meters, or gradients, may be taken as the true average for the middle of the stratum. On fig. 8, marked the temperature fall per 1000 meters in each gradient, these results are plotted at the middle distances between the 1000-meter levels, and they are connected up by proper curves, which form an interesting study. The first remark is that the result of the observations in the east sector of the high levels in winter and summer probably need to be modified, because the east line has escaped the concentration common to all the other lines. The second point is that the curvature of the lines indicates the prevailing cloud strata; that is where the lines slope upward to the right, and where the air is relatively warmer than the mean gradient would admit, a cloud formation takes place, as cumulus in the 1000–2000-meter stratum, cirrus in the 8000–10,000-meter stratum, winter and summer, and alto-cumulus in the 4000–6000-meter stratum in summer. These levels contain an especially large number of mixing currents of warm and cold masses, and the latent heat of condensation of vapor to water adds a certain amount to the heat transported from other regions. The third and most important remark is the fact that the temperature gradients in the atmosphere are very variable from one level to another, and that they are always smaller than the adiabatic gradient, 9.87, in these latitudes. In the latitudes farther south and in the Tropics, at least in the lower strata, the adiabatic gradient is, on the other hand, often less than that actually observed in the atmosphere. Such relations of observed to adiabatic gradients will form the key to my treatment of the thermodynamic formulæ in their application to the atmosphere. It is apparent that the Ferrel Canal Theory of the general circulation, poleward in the upper strata and equatorward in the lower strata, must be practically rejected or greatly modified in the following manner. The heat energy of the Tropics escapes toward the poles principally in two strata, the upper in the cirrus region, where there is mixing with cold currents from the poles, and the lower in the cumulus strata, where there is also mixing with the cold polar streams, while between these layers the intermediate strata are comparatively free from pronounced intermingling. The exact character and the extent of these operations in the cirrus level remain to be more fully investigated by suitable observations, which are required before the needed details can be secured. Especially in the tropical zones it is important to procure accurate thermal gradients up to high levels. The final solution of the problem of the circulation of the atmosphere is dependent upon such an exploration of the temperature conditions, because from these data alone can the corresponding pressure and density be computed.

TABLE 13.—*Mean temperatures, T, in cyclones and anticyclones.*

Height in meters.	Mean temperature.	High areas.				Low areas.			
		N.	E.	S.	W.	N.	E.	S.	W.
	WINTER.								
	°C.	°C.	°C.	°C.	°C.	°C.	°C.	°C.	°C.
10000	−54.2	−55.2	−56.2	−53.7	−52.2	−52.0	−51.2	−56.2	−57.0
9000	−47.7	−48.2	−50.2	−46.8	−45.3	−45.7	−44.7	−49.9	−50.7
8000	−40.6	−40.6	−43.6	−39.3	−37.6	−39.1	−37.9	−43.1	−43.9
7000	−33.6	−32.9	−37.1	−32.1	−29.6	−32.4	−31.1	−36.2	−37.1
6000	−26.7	−25.3	−30.7	−25.5	−21.7	−25.6	−24.5	−29.5	−30.5
5000	−20.0	−18.0	−24.6	−20.0	−14.3	−18.8	−18.0	−22.8	−24.0
4000	−14.3	−11.5	−18.6	−15.5	− 8.7	−12.5	−12.5	−16.7	−17.8
3000	− 9.0	− 6.3	−13.0	−10.3	− 4.2	− 6.8	− 7.6	−11.3	−12.4
2000	− 4.2	− 2.2	− 8.0	− 6.0	− 0.2	− 1.8	− 3.0	− 5.5	− 7.2
1000	− 0.6	+ 0.9	− 3.7	− 3.1	+ 2.7	+ 1.1	+ 0.7	+ 0.5	− 2.8
0	+ 3.6	+ 4.2	+ 1.5	+ 0.1	+ 5.6	+ 4.5	+ 4.7	+ 6.5	+ 1.9
	SUMMER.								
10000	−46.9	−48.1	−48.4	−46.7	−45.9	−42.1	−45.7	−48.9	−49.4
9000	−40.1	−40.7	−42.1	−39.6	−38.6	−35.5	−38.9	−42.4	−42.9
8000	−32.8	−32.8	−35.3	−31.8	−31.0	−28.4	−31.8	−35.5	−35.8
7000	−26.1	−25.4	−29.1	−24.6	−24.1	−21.9	−24.9	−29.1	−29.3
6000	−19.9	−18.5	−23.2	−18.7	−17.5	−15.9	−18.5	−22.9	−23.4
5000	−13.6	−11.7	−16.8	−13.7	−10.8	−10.3	−12.2	−16.3	−16.6
4000	− 7.2	− 4.9	−10.4	− 7.7	− 5.0	− 4.4	− 5.9	− 9.2	− 9.8
3000	− 0.9	+ 1.0	− 3.8	− 1.3	+ 1.1	+ 1.5	− 0.6	− 1.9	− 3.5
2000	+ 4.3	+ 5.7	+ 2.1	+ 3.9	+ 5.9	+ 6.2	+ 4.5	+ 4.3	+ 1.9
1000	+10.0	+10.5	+ 8.1	+ 8.8	+11.0	+11.2	+10.4	+11.0	+ 7.8
0	+15.7	+15.9	+14.1	+13.7	+16.1	+16.5	+16.5	+18.5	+14.2

RESUME OF THE TYPICAL DISTRIBUTIONS OF THE VELOCITY, TEMPERATURE, AND PRESSURE IN CYCLONES AND ANTICYCLONES.

Having described the typical distribution of the velocity in the local circulations, as in the International Cloud Report, 1898, or the MONTHLY WEATHER REVIEW for March, 1902, the pressure distribution, as in the MONTHLY WEATHER REVIEW for February, 1903, and the temperature in this paper, it will be proper to summarize the results schematically, as in figs. 9 and 10. The former gives the resultants of the general circulation in the north temperate latitudes plus the local component disturbances, and the latter simply the components by themselves, separated from the prevailing eastward drift. In fig. 9 the velocity is seen to diverge more and more from the eastward direction in the higher levels, and gradually to break up into the well-known cyclonic and anticyclonic gyrations in the lower

levels. The anticyclone has a system of outward components from top to bottom, and the cyclone a system of inward components from bottom to top, but in neither case can there be any true inversion in the type of the system. The temperatures show that the wave motion is intensified on approaching the surface, as the strong eastward drift is gradually diminished in the lower levels. The pressure, on descending from one level to the other, in the same way gradually takes on the well-known features of the high and low pressure areas, the high areas standing with the "saddle" toward the south, and the low areas with the "saddle" toward the north. The *closed* isobars decrease in density from the surface upward, and disappear at two or three miles above the ground, being depleted at the top by penetration into the eastward drift. Whenever closed isobars occur there is a vertical component of the circulation, downward in anticyclones, upward in cyclones. There is evidently very little vertical movement in the upper levels of the atmosphere, where the isobars are mere wavy lines, unless some unobserved closed isobars occur, as is probably the case in the development of hurricanes in the Tropics.

In fig. 10 the disturbing components are given for the velocity, temperature, and pressure. In the velocity of the anticyclone there is a gradual transition of the known outflowing structure at the surface into a simple loop in the upper levels, the orientation being changed only a little; in the cyclone the inflowing components are better preserved from the surface to the higher levels, but there is a distinct rotation of the structure through about one quadrant. The temperatures show the maximum disturbances on the boundary of the high and low areas, with a distinct rotation of both the cold and warm areas through one quadrant. The pressure disturbances consist of closed isobars gradually diminishing into loops in the higher levels and rotating through one quadrant, especially in the cyclone. In one aspect the analytical solution of this dynamic structure is simpler than that demanded in Ferrel's or in Guldberg and Mohn's adopted types of vortices, but it is certainly different from either of them. It is evidently necessary to distinguish carefully between the cyclonic system proper and the resultant system formed by its combination with the general eastward drift, so that the mathematical analysis shall not deal with the components and resultants indiscriminantly. It is not proper to appeal to observed resultant motions in the atmosphere in verification of a theory applying solely to the components, namely, the cyclonic and anticyclonic gyrations as examples of a special form of vortex. Having thus found at least an approximate system of correlated velocities, temperatures, and pressures in the atmosphere, it will be possible to approach the mathematical analysis of the structure with some prospect of a satisfactory solution.

VERTICAL AIR CURRENTS.

By FRANK W. PROCTOR. Dated Fairhaven, Mass., January 28, 1906.

In the MONTHLY WEATHER REVIEW for September, 1905,[1] Mr. Clayton mentions two instances of vertical air currents having considerable lifting power. Both occurred on mountains, and Mr. Clayton expresses the opinion that "it is probable that near the ground over a level country the air can have no great vertical motion, except in whirlwinds, so that phenomena of this kind are not observed."

The writer has observed one case of a descending vertical air current in a valley, which seems to be a precise counterpart of the current that lifted Mr. Eddy's kite vertically about 1000 feet above Blue Hill, as described by Mr. Clayton. It was in summer, and the writer was flying a Hargrave kite of the Weather Bureau pattern, standard size, without any load, at Andover, N. H., in the valley lying between Ragged and Kearsarge mountains. These mountains rise 1400 and 2400 feet, respectively, above the level of the valley floor, which is narrow at this point.

Upward of 2000 feet of wire were out when the line apparently broke, and the kite fell rapidly and disappeared. The line of flight was across a river, and in order to prevent if possible the wire from sagging into the river and getting wet, the line was reeled in as rapidly as possible. With no tension on the wire, and a reel that took in approximately five feet at every turn, the line came in pretty fast After about 500 feet had been reeled in, the kite was seen to rise, and it was then discovered that the line was not broken, and that the fall of the kite was due to a descending air current.[2]

At another time on a summer day at the same place, this kite, while flying at an ordinary angle, rose and passed the zenith at a height of about 1000 feet, being lifted by a vertical current. There was no cloud overhead.

The writer has several times had toy kites lifted by vertical currents during summer anticyclonic weather, while flying at levels from 100 to 300 feet, over the south shore of Massachusetts, where the ground is tolerably level. From the fact that in the nonenergetic summer areas of high barometer falling currents are rarely seen, while rising currents are not rare, it seems to be a fair inference that at this time of year the slow descent of large masses of air is offset by the more rapid ascent of small masses. These small rising masses are probably too irregular in horizontal section and too evanescent to generate whirls.

[1] Pages 390-91.

SNOW FORMED BY MIXTURE OF WARM AND COLD AIR.

By RICHARD W. GRAY, Assistant Observer, Weather Bureau. Dated Atlantic City, N. J., February 7, 1906.

At Atlantic City, N. J., on February 6, snow, in the form of minute flakes, fell continuously from 10:45 a. m. to 3:30 p. m., the sky during this period being perfectly clear. At intervals, and for periods of from one to two minutes, the flurries were quite heavy, and, except for the size of the snowflakes, had every appearance of an ordinary snowstorm. Condensation seemed to take place at a low altitude (probably not more than 75 or 100 feet above the ground), and had practically ceased at the elevation of ordinary buildings.

The unusual condensation was evidently caused by the mixing of relatively warm and moist air from the ocean with the colder air over the land. The wind, during the occurrence of the phenomenon, was from the northeast; the temperature ranged from 15° to 22°, and the relative humidity averaged about 70 per cent. Strato-cumulus clouds began to form about 3:30 p. m., at which time the snow ceased.

It is generally taught that rain and snow are formed principally by the cooling due to the expansion of rising moist air; still it is also recognized that small amounts of rain or snow can be formed by the cooling due to the radiation of heat during the nighttime, but the quantities formed are small, the process is slow, and the radiation is itself checked by the haze or fog or thin cloud that accumulates, so that the radiation can only take place from the upper surface of a cloud.

Precipitation can also take place by the intimate mixture of warm and cold moist air, and, if the masses and temperatures are properly adjusted, light snow may be formed in this case. It frequently occurs in the winter months that a mass of clear, cold air, moving southward from Canada, encounters a corresponding mass of warm, moist air in the United States, and the pressures and densities are so well adjusted that we have a well-defined band trending east and west, showing gentle southerly winds on the south side, and gentle northerly winds on the north, with a belt of cloudy air separating them, over which light rain or snow occasionally falls. Eventually, some-

[2] Would not a simple failure of the wind have produced the same drop of the kite and wire?—*C. A.*

times after several days, a whirl begins at the westerly end of this band, and the whole system resolves itself into a "low" with its whirling winds.

A close analogy is found between these bands of opposing winds and the case quoted in the preceding note, where cold, moist air from the ocean was flowing inward on the New Jersey coast, while at the same time, according to the weather map, a cold, dry, northwest wind was blowing from the interior over this region. The northeast ocean wind, having a temperature of 15° to 22° F., was mixing with the northwest land wind, having a temperature of about 0° F., judging from the isotherms of the morning weather map, producing the minute snowflakes described by Mr. Gray. It is to be regretted that the exact temperature, moisture, and wind could not have been observed by Mr. Gray, with the help of kites, at various elevations. The layer of northeast wind seems to have extended above the buildings in his neighborhood, but the weather map shows that the dry, cold wind must have been present, probably as a very gentle upper wind from which cold air descended in little streaks, just as we see in an area of high pressure and clear blue sky on a summer day, when air comes down in little gusts, spreading outward as they strike the ground, carrying the dust before them as the wind rolls along the ground.—*C. A.*

PREVENTION OF DAMAGE BY FROST.

By ROBERT P. SKINNER, U. S. Consul General, Marseilles, France. Dated January 25, 1906.

No general attempt is being made in France to prevent the destructive influence of frost in the vine-growing regions. The traditional method of waging warfare against such influences is by creating a dense smoke, caused by burning damp straw, but the process is expensive and of doubtful efficacy. Several proprietary compositions, intended to perform efficiently the work inadequately performed by burning straw, are upon the market, but their sale has been kept back by the low prices which common table wines now bring, so low, indeed, that wine growers would rather see their crop damaged than spend any considerable amount of money to prevent it. Nevertheless many proprietors of advanced ideas, and especially such as produce expensive kinds of wine, are making what seems to be an increasing market for the smoke producing preparations offered for sale. The officers of the best known company in this business inform me that they took hold of the "Fumigène Mortier" about five years ago, and though they have not advertised it publicly, they say that this branch of their very large business is steadily increasing, and that within the last three years they have themselves disposed of 20,000 boxes in France alone. This would mean, in a period of three years, about 2000 hectares (4942 acres) treated. In 1903, 1500 boxes were sold by the same company in Smyrna, after which the Turkish Government put a stop to the importation, on the ground that the boxes contained nitrate of potash. I have no knowledge in regard to the commercial success of other devices, all of which appear to have been subjected to numerous tests in the presence of official and semiofficial committees.

From the account of one such test, which took place on May 21, 1900, near Auxerre, in charge of M. Méras, Director of the Society for the Reconstitution of French Vineyards, I take the following paragraphs:

> The experiments took place with different systems, industrial and natural, permitting the production of artificial clouds, which in their turn prevent the radiation which causes frost, and thereby prevent the killing of the buds. Let us first explain how frost is produced by radiation.
>
> Dew is deposited on a body when the latter, having allowed to escape during the night a portion of the solar heat received during the day, becomes so chilled by radiation as to lower the temperature of the adjacent air, and bring about a state of saturation. From that instant, if the air continues to become colder, the vapor which it contained is condensed in the form of dew. A white frost is produced when the temperature of the bodies on the surface of which the dew is formed is low enough to cause the dew to congeal. When a body is sheltered by cloths, straw-matting or natural clouds, the deposit of surface dew is light. As the radiation takes place in every direction, the heat radiated from the surface is reflected back by the shelter, whereby the chilling process is not sufficiently pronounced to result in a white frost.
>
> M. Méras proceeded to the successive lighting of the different combustibles prepared for the purpose of forming clouds. He first experimented with pots containing exactly 7.5 kilograms (16.5 pounds) of coal tar, this weight corresponding to those of the boxes bearing the names of Maydieu and Lestout, both manufactured at Bordeaux, and the "Fumigène Mortier," manufactured at Marseilles. The smoke produced by the coal tar proved to be black, and formed a screen less able to prevent radiation than that produced by a white smoke. The intensity of the smoke was increased by sprinkling water upon the tar by means of a broom. The first composition burned two hours, and it was judged that the boxes, placed at distances of 20 meters (65.61 feet) from each other, should have been separated by not more than 10 meters (32.80 feet). The fact that the buds appeared to be blackened after this operation need alarm no one, as this blacking is due simply to the deposit of soot. After these experiments with coal tar, the industrial preparations were taken up.
>
> The Lestout composition consisted of a square pine box, containing 7.5 kilograms (16.5 pounds) of residue from the manufacture of rosin. The boxes cost 1 franc (19.3 cents) each. The smoke, as black as in the first case, appeared to be heavier and rose less than that of burning tar. The period of combustion was one hour and a half. These boxes have the inconvenience of taking fire, and by their disaggregation they thus allow the contents to escape and burn upon a considerable surface, thus abridging the duration of the protecting cloud.
>
> The Maydieu box was next lighted, and gave the same results as the Lestout box, except that the period of combustion was longer. In both cases the intensity of the smoke is susceptible of being increased by covering the boxes with moss or dampened straw.
>
> The commission next experimented with boxes of dampened sawdust, mixed with bunches of green moss, straw manure, and damp straw. It required a considerable time to start the fires; but although these boxes gave a whiter smoke, it proved to be insufficiently dense to be really efficacious. By dosing the mixture with tar a more abundant smoke was obtained. These natural combinations, which are economical enough, have the disadvantage of proving useless in case of an abundant rain falling upon them during the night or even several days prior to the period of use. Small proprietors, however, who wish to avoid expense, may utilize them.
>
> The commission finally took up the newly invented preparation known as the "Fumigène Mortier" from Marseilles. This preparation was packed in boxes containing about 4 kilograms (8.8 pounds) of black powder, the boxes selling at 1.50 francs (29 cents) each. In the middle of the cover of the box a hole is made before the "Fumigène" is put in place. When the time comes to produce the smoke, the material is lighted from this hole, whereupon the box is turned over with the hole upon the earth. This being done by the commission, a very intense and very abundant smoke was immediately produced. This yellowish smoke formed a veritable cloud, constituting a powerful screen over the vineyard to be protected. This smoke remained in place longer than any smoke previously produced, in spite of a fairly strong wind. Had there been no wind, and there is none when frosts occur, it is certain that this smoke would remain in place long enough to prevent any white frost. According to the opinion of all present, the "Fumigène Mortier" gave the best results.

Since the original experiments were made along these lines the manufacturers claim to have perfected the composition, and they suggest an elaborate system of electrical wires connecting various parts of large estates with headquarters in such manner that when registering thermometers, set up in the vineyards, fall to the danger point, an alarm bell rings in headquarters, whereupon the overseer arouses his employees, and starts the protecting fires. M. Justin Lieutaud, of the Mas de l'Ange, Camargue, possesses such an installation, which protects 30 hectares (74.13 acres). My information in regard to M. Justin Lieutaud's equipment is dated five years ago, and I have no information in regard to his experience since.

It is to be remarked that frost-fighting methods are still in an uncertain and tentative stage. Reports in regard thereto, as well as in regard to efforts to counteract the processes of nature concerning rain and hail, are accepted with skepticism, and I do not myself wish to be considered as indorsing any process described. On the other hand so much is claimed, and the materials spoken of are so cheap, that American farmers can readily take the matter up on their own account.

Consular Agent Jouve, at Toulon, who has important vineyards of his own and whose experience I solicited, writes as follows:

Many experiments have been made in this region to protect vineyards against frost. The method of burning tar and other combustibles with a view to producing a dense smoke when frost is anticipated, is not specially efficacious, and is difficult, as fires must be lighted at the same time at a great number of places throughout the vineyard. To succeed well by the production of smoke, the vineyards should be located in the valley, and any wind will prevent the success of the experiment. In some districts the evil effects of frost are counteracted by leaving the branches uncut until the end of the cold season. By this method, if the terminal bud of the growing branch be frozen, the succeeding buds are unharmed. This, however, is a method which takes too much of the sap of the vine. In conclusion, all the processes of which I have heard are of uncertain practical value.

I have also the following information from Mr. F. Richter, a gentleman of large experience residing at Montpellier, in the heart of the wine-growing region:

The methods now known of preventing damage by frost are not always efficacious, and when the temperature falls below 4° or 5° C. (39° or 41° F.) at the level of the young shoots, the cases are rare when the method regarded as most efficacious provides a sufficient protection. The radiation of plants is diminished very sensibly during clear nights by the distribution of white powder upon the leaves, and the effect is the more pronounced in proportion as the green organs intended to be protected are the more evenly covered. This method has never been generally adopted, and it may be said at present that the method of fighting the frost most frequently employed is the creation of clouds of smoke.

In the vineyards the owners establish low piles of vine shoots mixed with brush and covered with earth, or perhaps straw mixed with green plants of all sorts, capable of forming a great deal of smoke. The intensity of the smoke is increased by sprinkling water upon the earth during combustion. Still more commonly, however, land owners make use of manufactured preparations such as the Lestout box and the Fumigène Mortier. These preparations are lighted generally in the morning, when the temperature is reached at which white frost is formed, and they are kept burning until after sunrise, so as to delay the thawing, which is as bad for the plants as the frost itself.

My California correspondent, who seeks this information, says that he has heard of the shooting of chemicals over vineyards, a process concerning which I have no information. The Reveil Agricole, published on January 21, 1906, refers to the use of chemicals for the purpose of overcoming the damage by frost, not by shooting the same over the vines and trees, but in the form of a fertilizer. This article says that experiments have been made with potassic fertilizers upon several fields of wheat. After a rigorous winter the parcel of ground untreated gave a crop less than one-half of that yielded by fields which had not suffered from cold, while another parcel of land which had been frozen and which had also been treated with this fertilizer gave a normal crop. M. Laroux, the Professor of Agriculture at Marseilles, reports that in a nursery at Gotha, Germany, the use of 400 kilograms, (881.84 pounds) of chloride of potassium per hectare (2.47 acres) saved all the trees from frost in 1900–1901, while trees not so treated were decimated in the proportion of from 10 to 20 per cent. The Reveil Agricole adds that this is not a simple coincidence, and that there is a specific and very curious action of potassic salts of which the writer does not pretend to know the explanation. At Dreux, on an experimental farm, parcels of wheat and lucerne which had not been treated with potassium were feeble and unsatisfactory after a hard winter, while on the same farm wheat and lucerne which had been given this chemical treatment were much more vigorous.

EARLY KNOWLEDGE OF THE TIDES AT PANAMA.

By R. A. HARRIS, of the Coast and Geodetic Survey. Dated Washington, D. C., March 19, 1906.

In Chapter IX of his Sumario de la Natural Historia de las Indies which was published in 1526, Oviedo y Valdez makes the first mention of a question which has continued to be of interest down to the present time, viz, the smallness of the tides in the Caribbean Sea and the greatness of the tides on the Pacific coast of Darien.

He compares the tides in the Caribbean Sea to those of the Mediterranean, and the tides on the Pacific coast to those found on the western coast of Europe; for the great difference between the tides of the ocean and of the Mediterranean was a fact known to geographers since the time of Aristotle. Equally long ago had the conclusion been reached that large tides, as a rule, belong to large seas.

In Oviedo's time the movements of the ocean were commonly ascribed to the westward motion of the primum mobile so that—

"*Ad coeli motum elementa (excepta terra) moventur.*"

However, Josephus Acosta (1539?–1600) considers the water to be too closely connected with the earth to partake of this general movement (Purchas his Pilgrimes, Vol. III, page 924); but in his remarks upon the tides he does not suggest any universal cause. (Ibid. pp. 929, 930.)

It seems from Oviedo's mention of the Mediterranean tides that he regards them as entirely derived from those in the Atlantic.

As a matter of fact, recent observations and study prove that the western portion of this sea is governed by the Atlantic in somewhat the manner indicated by Oviedo, while the eastern portion, from Sicily to the Levant, has a rise and fall of its own and is tidally independent of the Atlantic.

The small tides along the northern shores of Darien are due to the equilibrium tide of the western portion of the Caribbean Sea, while those of the eastern portion of this sea, although small, are derived from the Atlantic. The passages between the Lesser Antilles are numerous and often large; but the smallness of the outside rise-and-fall prevents the derived tide from being large in the Caribbean waters. This smallness of the outside ocean tide is due to the fact that a nodal line of a stationary oscillation extends from near the island of Guadeloupe in a northeasterly direction.

The large tides off Gibraltar and the port of Panama are due to the fact that a loop of a fundamental oscillating system lies near each of these two localities.

The semidaily range of tide at Panama is 12.6 feet, while at Colon it is but 0.6 foot.

It happens that when it is high or low water at Panama it is very nearly half tide level at Colon, and vice versa.

My attention was called to Oviedo y Valdez's account of the tides by Professor Abbe, who recently sent me a tentative translation of a few sections of the Sumario, made by Miss F. Isabelle Wilbur.

An English translation of extracts from the Sumario is given by Purchas in his Pilgrimes, Vol. III. That relating to the tides occurs on page 989, and is substantially the same as the matter just referred to, and reads as follows:

Of the increase and decrease (that is) rising and falling of our Ocean Sea, and South Sea, called the Sea of Sur.

I will now speake of certaine things which are seene in the Prouince, or at least in the Citie of *Golden Castile*, otherwise called *Beragua*, and in the coasts of the North Sea, and of the South Sea, called the Sea of *Sur*, not omitting to note one singular and maruellous thing which I haue considered of the Ocean Sea, whereof hitherto no Cosmographer, Pilot, or Mariner, or any other, haue satisfied me. I say therefore, as it is well knowne to your Maiestie, and all such as haue knowledge of the Ocean Sea, that this great Ocean casteth from itselfe the Sea *Mariterraneum* by the mouth of the Straight of *Gibralterra*, in the which the water, from the end and furthest part of that Sea, euen vnto the mouth of the said Straight, either in the East toward the coast commonly called *Leuante*, or in any other part of the said Sea *Mediterraneum*, the Sea doth not so fall or increase, as reason would judge for so great a Sea, but increaseth very little, and a small space: Neuerthelesse, without the mouth of the Straight in the mayne Ocean, it increaseth and falleth very much, and a great space of ground from sixe houres to sixe hours, as in all the coasts of *Spaine*, *Britaine*, *Flanders*, *Germanie*, and *England*. The selfe same Ocean Sea in the firme Land newly found, in the coasts of the same lying toward the North, doth neither rise nor fall, nor likewise in the Ilands of *Hispanola* and *Cuba*, and all the other Ilands of the same lying toward the North, for the space of three thousand leagues, but onely in like manner as doth the Sea *Mediterraneum* in *Italie*, which is in manner

nothing, in respect to that increase and decrease which the said Ocean hath in the coasts of *Spaine* and *Flanders*. But this is yet a greater thing, that also the selfe same Ocean in the coasts of the said firme Land lying toward the South, in the Citie of *Panama*, and also in the coast of that Land which lyeth toward the East and West from that Citie, as in the Iland of *Pearles* or *Margarita*, which the *Indians* called *Tarrarequi*, and also in *Taboga* and *Otoque*, and in all other Ilands of the South Sea of *Sur*, the water riseth and falleth so much, that when it falleth, it goeth in manner out of sight, which thing I myselfe haue seene oftentimes. And here your Maiestie may note another thing, that from the North Sea to the South Sea, being of such difference the one from the other in rising and falling, yet is the Land that diuideth them not past eighteene or twentie leagues in breadth from Coast to Coast. So that both the said Seas, being all one Ocean, this strange effect is a thing worthy greatly to bee considered of all such as haue inclination and desire to know the secret workes of Nature, wherein the infinite power and wisedome of God is seene to be such as may allure all good Natures to reurence and loue so diuine a Maiestie.

RECENT PAPERS BEARING ON METEOROLOGY.

H. H. KIMBALL, Librarian.

The subjoined titles have been selected from the contents of the periodicals and serials recently received in the Library of the Weather Bureau. The titles selected are of papers or other communications bearing on meteorology or cognate branches of science. This is not a complete index of the meteorological contents of all the journals from which it has been compiled; it shows only the articles that appear to the compiler likely to be of particular interest in connection with the work of the Weather Bureau. Unsigned articles are indicated by a ——

Bulletin of the American Geographical Society. New York. Vol. 38. Feb., 1906.

Abbe, Cleveland. The present condition in our schools and colleges of climatology as a branch of geography and of meteorology as a branch of geophysics. Pp. 121–123.

Abbe, Cleveland. A modified polar projection adapted to studies in dynamic meteorology. Pp. 126–128.

Rotch, A. Lawrence. Proof of the existence of the upper antitrade and the meteorological conditions at lesser heights in the northern Tropics. Pp. 128–130.

Brown, Robert Marshall. Notes on the Mississippi River flood of 1903 and on floods of other years. Pp. 131–134.

Nature. London. Vol. 73. Feb. 1, 1906.

B., T. G. Variation of glaciers. Pp. 320–321.

—— International Meteorological Conference at Innsbruck. Pp. 331–332.

Nature. London. Vol. 73. Feb. 8, 1906.

Report of the meeting of the Solar Commission at Innsbruck. Pp. 352–354.

Nature. London. Vol. 73. March 1, 1906.

Kingsmill, Thos. W. A 300-year climatic and solar cycle. Pp. 413–414.

Hildebrandsson, H. Hildebrand. Studies of clouds. Pp. 416–417.

Nature. London. Vol. 73. March 8, 1906.

Rotch, A. L[awrence] and Teisserenc de Bort, L[eon]. The vertical distribution of the meteorological elements above the Atlantic. Pp. 449–450.

Proceedings of the American Association for the Advancement of Science. Boston. Vol. 41. Feb., 1906.

Richards, Theodore W., and Jackson, Frederick G. A new method of standardizing thermometers below 0° C. Pp. 451–454.

Quarterly Journal of the Royal Meteorological Society. London. Vol. 32. Jan., 1906.

Moore, John W. The rainstorm of August 24–26, 1905, in eastern Ireland. Pp. 1–10.

Newton, William B. The aquameter. Pp. 11–13.

—— Rainfall of China and Korea. [Extract from paper by T. Okada.] P. 28.

Sutton, J. R. Comparison between Glaisher's factors and Ferrel's psychrometer formula. Pp. 35–45.

Ball, John. A rapid method of finding the elastic force of aqueous vapor and the relative humidity from dry-bulb and wet-bulb thermometer readings. Pp. 47–52.

Meinardus, Wilhelm. Variations in the circulation of the North Atlantic and the phenomena connected therewith. [Translated by R. H. Scott.] Pp. 53–55.

Science. New York. New Series. Vol. 23. Feb. 16, 1906.

McKee, Ralph H. The primeval atmosphere. Pp. 271–274.

Science. New York. New Series. Vol. 23. March 9, 1906.

Tamura, S. Tetsu. Japanese meteorological service in Korea and China. Pp. 396–397.

Symons's Meteorological Magazine. London. Vol. 41. Feb., 1906.

W., A. The packing of meteorological instruments. Pp. 9–10.

Annuaire de la Société Météorologique de France. Paris. 54 année. Jan., 1906.

Teisserenc de Bort, L[eon]. Sur l'études des alizés et des contrealizés sur l'Atlantique Nord. Pp. 9–14.

Durand-Gréville, E. Les cartes d'isobars par millimètre et la prevision journalière du temps. Pp. 27–32.

Teisserenc de Bort, L[eon]. Le concours de prévision du temps de Septembre 1905. Pp. 32–35.

Ciel et Terre. Bruxelles. 26 année. 1 fév., 1906.

Hergesell, H[ugo]. L'état actual et l'avenir de la météorologie maritime. Pp. 567–575.

Ciel et Terre. Bruxelles. 26 année. 16 fév., 1906.

—— La couche d'air chaud des régions elevées de l'atmosphère, [Note.] Pp. 610–612.

—— Effets magnétiques de la foudre sur les roches volcaniques. [Note.] Pp. 615–616.

Revue Néphologique. Mons. Fév., 1906.

Bracke, A. Formation de ciel moutonne. Pp. 9–11.

B[racke], A. Le relief du sol et la pluie. Pp. 13–14.

Bracke, A. La direction des cirrus. Pp. 14–16.

Annalen der Hydrographie und Maritimen Meteorologie. Berlin. 34 Jahrgang. Heft 2, 1906.

Köppen, W. Die Drachenstation der Deutschen Seewarte. Pp. 49–62.

Annalen der Hydrographie und Maritimen Meteorologie. Berlin. 34 Jahrgang. Heft 3, 1906.

Köppen, W. Die Drachenstation der Deutschen Seewarte. Pp. 97–110.

Heyne, —. Die Witterung zu Tsingtau im Juni, Juli, und August 1905, nebst einer Zusamenstellung für den Sommer 1905. Pp. 110–114.

Aus dem Archiv der Deutschen Seewarte. Hamburg. 28 Jahrgang. No. 2, 1905.

Knoche, Walter. Ueber die räumliche und zeitliche Verteilung des Wärmegehalts der unteren Luftschicht. Pp. 1–46.

Gaea. Leipzig. 42 Jahrgang. März 1906.

—— Die Bekämpfung des Nebels durch Elektrizität. Pp. 150–151.

—— Die Störungen der Luft und des Wassers. Pp. 153–159.

Illustrirte Aeronautische Mitteilungen. Strassburg. 10 Jahrgang. Feb., 1906.

Wegener, Kurt. Die meteorologischen Schwierigkeiten der Drachenaufstiege. Pp. 33–40.

—— Ein neuer Windmesser für direkte Ablesung. Pp. 85–87.

Meteorologische Zeitschrift. Braunschweig. Band 23. Feb., 1906.

Gockel, A[lbert]. Ueber den Ionengehalt der Atmosphäre. Pp. 53–67.

Klein, [Hermann Joseph]. Cirrus-Studien. Pp. 67–82.

Hann, J[ulius]. Der Pulsschlag der Atmosphäre. Pp. 82–86.

—— Ergebnisse meteorologischer Beobachtungen in Ost-Spitzbergen 1894–94. P. 87.

Polis, P[eter]. Ergebnisse der Luftdruckregistrierungen zu Aachen 1896 bis 1903. Pp. 87–92.

Zöllner, S. Graphische Darstellung der täglichen Bestrahlung der Erde durch die Sonne in verschiedenen Monaten und Breiten. Pp. 92–94.

Less, E[mil]. Thévenet: Recherches sur la prévision du temps en Algerie. Pp. 94–95.

Mitteilungen von Forschungsreisenden und Gelehrten aus den Deutschen Schutzgebieten. Berlin. 18 Band. 4 Heft 1905.

Uhlig, C. Regenmessungen aus Deutsch-Ostafrika. Pp. 352–359.

—— Resultate der meteorologischen Beobachtungen in Herbertshöhe. Pp. 360–367.

—— Resultate der Regenmessungen in Kaiser-Wilhelmsland, im Bismarck-Archipel, auf den Karolinen, Marianen, und Marshall-Inseln. Pp. 368–375.

Hemel en Dampkring. Amsterdam. 3 Jahrgang. Feb., 1906.

Nell, Chr. A. C. Uitkomsten der waarnemingen omtrent poolbanden, van 1874 tot 1894 hoofzakelijk te Groningen en te Oosterbeek (bij Arnhem) verricht door Civ. Ing. H. I. Groneman. Pp. 145–150.

Nell, Chr. A. C. De halo's. Pp. 157–162.

RECENT ADDITIONS TO THE WEATHER BUREAU LIBRARY.

H. H. KIMBALL, Librarian.

The following titles have been selected from among the books recently received, as representing those most likely to be useful to Weather Bureau officials in their meteorological work and studies. Most of them can be loaned for a limited time to officials and employees who make application for them.

Associacion de Ingenieros y Arquitectos de Mexico.
Anales. Tomo XII. 341 pp. 8°. Mexico. 1904.

Baden. Zentralbureau für Meteorologie und Hydrographie.
Ergebnisse der Untersuchung der Hochwasserverhältnisse im Deutschen Rheingebiet. VII. Heft. Das Moselgebiet. 67 pp. f°. Berlin. 1905.

Belgium. Commission de la Belgica.
Expédition antarctique belge. Rapports scientifiques. Resultats des voyages du S. Y. Belgica. Vol. I. v. p. f°. Anvers. 1905.

Börnstein, R[ichard].
Leitfaden der Wetterkunde. xi, 230 pp. 8°. Braunschweig. 1906.

Carnegie Institution of Washington.
Contributions from the Solar Observatory, Mt. Wilson, California. (Repr. from Astrop. j., v. 23., Jan., 1906.)
3. A programme of solar research. By George E. Hale. 5 pp.
4. Some tests of the snow telescope. By George E. Hale. 5 pp.
5. Photographic observations of the spectra of sun spots. By George E. Hale and Walter S. Adams. 34 pp.
6. Some notes on the H and K lines and the motion of the calcium vapor in the sun. By Walter S. Adams. 9 pp.
7. The five-foot spectroheliograph of the solar observatory. By George E. Hale and Ferdinand Ellerman. 10 pp.

Cattell, J[ames] McKeen (Ed.).
American men of science. vii, 364 pp. 4°. New York. 1906.

Ceylon. Surveyor-General.
Report on the meteorology of Ceylon for 1904. (Administration reports, 1904. Part IV.) F1-41. f°. [Colombo, 1905.]

Dechevrens, Marc.
La pression et la temperature dans l'air dans les cyclones et les anticyclones. 7 pp. 4°. n. t. p.

Geneva. Observatoire de Genève.
Résumé météorologique de l'année pour Genève et le Grand Saint-Bernard. 104 pp. 8°. Genève. 1905.

Great Britain. Meteorological Office.
The relation between pressure, temperature, and air circulation over the South Atlantic Ocean. By M. W. Campbell Hepworth. 12 pp. 8°. London. 1905.

Hamburg. Deutsche Seewarte.
Deutsches Meteorologisches Jahrbuch für 1904. vi, 182 pp. f°. Hamburg. 1905.

Hongkong Observatory.
China coast meteorological register. 1905. n. p. f°. [Hongkong.] 1905.

India. Meteorological Department.
Copies of memoranda on the monsoon submitted to Government in April, May, June, August, and September, 1905, and a comparison of the forecasts with the actual rainfall. v. p. f°. [Simla.] 1906.

Innsbruck. Universität. Meteorologisches Observatorium.
Beobachtungen. 1901. n. p. 8°. Innsbruck. 1903.
Same. 1902. n. p. 8°. Innsbruck. 1905.

Kungl. Svenska Vetenskapsakademien.
Meteorologiska iakttagelser. 1904. x, 157 pp. f°. Upsala. 1904.

Mexico. Observatorio Meteorologico Magnético Central.
Tiempo probable durante el ano meteorologico de 1906 en la Republica Mexicana. 10 pp. 4°. Mexico. 1906.

Moscow. Agronomic Institute. Meteorological Observatory.
Observations. [Russian text.] 1903. xxxix, 72 pp. 8°. Moscow. 1904.
Same. 1904. xlvii, 72 pp. 8°. Moscow. 1906.

(13th) National Irrigation Congress, Portland, Oregon.
Official proceedings. 280 pp. 8°. Portland. 1905.

Oaxaca (State). Observatorio Meteorologico Central.
Decreto que establece la red meteorológica del Estado de Oaxaca. 10 pp. 4°. Oaxaca. 1905.

Oña (Spain). Colegio Maximo de la Compañia de Jesus.
Observaciones meteorologicas de 1905. 60 pp. 8°. Oña. 1906.

Puente, Carlos.
Meteorologia popular e referanero meteorológico. I. Climatología. 279 pp. 8°. Madrid. 1896.

San Fernando. Instituto y Observatorio de Marina.
Anales. Sección 2ª. Observaciones meteorlógicas, magnéticas y seismicas. Año 1904. vii, 155 pp. f°. San Fernando. 1905.

Sandström, J. W.
On the construction of isobaric charts for high levels in the earth's atmosphere and their dynamic significance. (Extr. from Trans. Amer. phil. soc. N. S. v. 21, Pt. 1. Pp. 31-94. Phila. 1905.)

Société Astronomique et Météorologique de Port au Prince.
Bulletin annuel. 15 pp. 4°. Port au Prince. 1906.

Ward, Robert De C[ourcy].
The hygiene of the zones. (Repr. from Bull. geogr. soc. Phila. v. 4, No 2. Jan., 1906.) 27 pp. 8°.

Wood, Robert W[illiams].
Physical optics. xiii, 546 pp. 8°. New York. 1905.

PUBLICATION OF RIVER GAGE READINGS.

River stations are maintained by the Weather Bureau in the interest of navigation. At the present time the numerous stations report by telegraph to 24 district centers, where forecasts and warnings are issued under the supervision of the Central Office at Washington, D. C. The publication of the 8 a. m. readings of the river gages is of great importance to local hydraulic engineers, and the seventh volume of such publication, by Prof. H. C. Frankenfield, has just been issued by the Weather Bureau. The whole series of volumes covers the following periods, respectively: Part I, 1858–1889; Part II, 1860–1889; Part III, 1875–1889; Part IV, 1890–1892; Part V, 1893–1895; Part VI, 1896–1899; Part VII, 1900–1904.

The river stages given are vertical heights, in feet and tenths of a foot, of the river surface above or below an arbitrarily assumed plane, which is approximately that of lowest water occurring at any place with a natural free flow of water. Abnormally low water due to an ice gorge above a station is not considered in establishing low water.

Observations of river stages are made as near 8 a. m., seventy-fifth meridian time, as the exigencies of the service will permit.

The tabulated gage readings are preceded by a statement which includes the locations of stations, description of gages and bench marks, heights of danger lines, low water and flood marks, and other data for the various river stations whose gage readings are included in the tables. The gage readings are arranged by river systems, and are preceded by two indexes—one alphabetical with respect to the various river systems, and the second following the arrangement of the text. The former is useful in studying the regimen of any given river, while the latter enables ready reference to be made to any desired station.

Following the descriptive text are given tables of elevations of zeros of river gages above mean sea level, danger-line stages, and the lengths of the rivers and their drainage areas.—*C. A.*

WEATHER BUREAU MEN AS EDUCATORS.

Mr. S. S. Bassler, Local Forecaster, Cincinnati, Ohio, under date of February 23, reports that on February 21 he read a paper on the work of the Weather Bureau before a farmers' institute at Amelia, Ohio.

Mr. Patrick Connor, Local Forecaster, Kansas City, Mo., reports a short address on the weather before the meeting of the school principals of that city December 16, 1905.

Mr. M. L. Fuller, Assistant Observer, reports the following lectures given during February and March: February 9, before the Chickasaw County Farmers' Institute, Nashua, Iowa, an illustrated address on weather forecasts, and how the farmer may profit by them. February 10 and 14, at Weather Bureau office, Charles City, to teachers from local high school and Charles City College, and to the local press; also February 19, at Mason City, Iowa, High School; also March 12, at Storm Lake, Iowa, High School, a lecture, illustrated by stereopticon, on weather forecasts and the work of the Weather Bureau. February 14–17, a series of four 40-minute addresses before the students of Charles City College. February 19, office equipment explained to 30 students of the college. March 8, before the Dows, Iowa, High School; also March 12, at Buena Vista College, an address on forecasts and the Weather Bureau.

Mr. G. A. Loveland, Section Director, Lincoln, Nebr., under date of February 19, 1906, reports the following public addresses recently made by him: Before the teachers of the science section of the Nebraska State Teachers' Association on December 28, 1905, on the subject of clouds, illustrated by stereopticon. Before the Young Men's Christian Association of Exeter, February 9, on how the weather is made.

Prof. A. G. McAdie, of the San Francisco, Cal., office, reports a lecture, illustrated with stereopticon, on atmospheric vapor and mountain observatories at the Congregational Church, Reno, Nev., under the auspices of the State University, on the evening of February 21.

Mr. G. Harold Noyes, Observer, La Salle, Ill., reports the following educational work: An informal address in the Weather Bureau office, with explanation of instruments, to the members of the La Salle County Editorial Association. April 28, 1905, a prepared address was delivered before the class in general science of the La Salle-Peru Township High School; the class subsequently visited the office in small sections. During the Christmas vacation a class from the Lincoln School visited the Weather Bureau office, and listened to an explanation of the work of the Bureau, and studied the instruments; a day or two later some students of Northwestern University made a similar informal visit.

Mr. G. R. Oberholzer, Observer, La Crosse, Wis., under date of February 16, reports that classes in physical geography and physics from the senior class of the high school had recently visited the Weather Bureau office; the instruments used by the Bureau were exhibited and explained, and a talk was given covering the making and use of weather maps. He was also called upon to address the La Crosse Agricultural, Horticultural and Dairy Association on February 14, when the movement of storms and cold waves was illustrated by means of maps distributed among the audience.

Mr. H. W. Richardson, Local Forecaster, Duluth, Minn., under date of February 27, reports that the physiography section of the Duluth State Normal School, 40 pupils, visited the Weather Bureau office, and that the instrumental equipment was explained and a brief lecture delivered, dealing with meteorology, forecasting, and the general work of the Bureau.

Mr. G. N. Salisbury, Section Director, Seattle, Wash., under date of February 20, reports the following educational work during January, 1906: On the 23d he completed his course of instruction for the semester (22 lessons) to the class in practical meteorology at the State University. On the evening of the 23d, before the Young Men's Real Estate Club, a short sketch was given of the inception and work of the old Signal Service, and the organization, methods, and scope of the work of the present Weather Bureau. On January 24 a section of the Ballard High School class in physical geography visited the office, and were shown the instruments. On the 26th a second section of the above class made a similar visit, and on the 30th a class in physical geography from the Brighton High School. On the evening of February 19 Mr. Salisbury lectured before the Men's Club of the First Methodist Church of Seattle on wind, rain, and weather changes due to cyclones and anticyclones.

Mr. James H. Spencer, Observer, Dubuque, Iowa, reports that on the evening of March 14 he spoke on the weather before about fifty members of St. Luke's Fraternity of that city; the talk was illustrated by use of weather maps and blackboard diagrams.

Mr. W. P. Stewart, Escanaba, Mich., under date of February 7 reports that the class in physics from the Escanaba High School visited the Weather Bureau office in two sections on February 2 and 6; each section was given a 45-minute lecture on the construction and use of thermometers, and the distribution of atmospheric temperatures.

LIFE AND WORK OF JAMES P. ESPY.

In reply to a recent letter the Editor has said:

The general relation of modern meteorology to Professor Espy's work is well known, but the special relations between himself and the National Government are only imperfectly understood. He was appointed Government meteorologist about 1842, and assigned to duty first in the War Department, then in the Navy Department, and eventually under the Smithsonian. The last few years of his life seem to have been spent, without Government salary, in putting his fourth report through the press. The details of his official relations to the Government can, I think, only be discovered by careful search through the records of the various departments, with the hearty assistance of the respective officials. I hope that some one will work up this chapter in Espy's life. A preceding period, namely his life in Philadelphia, is equally interesting, but can be worked up only by some one having access to the records in that city.

The Editor has long been collecting whatever scraps of information he can find relative to the life and work of James Pollard Espy. A few items are given in the MONTHLY WEATHER REVIEW (see vol. 24, 1896, p. 334; vol. 25, 1897, p. 163; and vol. 28, 1900, p. 209); also Weather Bureau Bulletin 11, pp. 305-316. There is also a sketch of his life, with a portrait, in Popular Science Monthly for April, 1889, pp. 834–840. See also "Remarks on the character, life, and work of Espy," by Professor Bache, in the Smithsonian Report for 1859, pages 108–111.

The following article is copied from "Notes and queries, historical and genealogical, chiefly relating to interior Pennsylvania," edited by William Henry Egle, reprint, third series, volume 3, Harrisburg, Pa., 1896, page 73. The items have undoubtedly been gathered by Doctor Egle from "A few incidents in the life of Prof. James P. Espy," by his niece, Mrs. L. M. Morehead, Cincinnati, Ohio, 1888, and are not easily accessible to the readers of this REVIEW.

In the "Reminiscences of B. Perley Poore," lately issued from the press, there appears a strange misstatement in a short sketch of the life of the distinguished meteorologist, Prof. James P. Espy, to the effect that his education had been so neglected that at the age of seventeen he could not read. In justice to his parents, people of education, and to his relatives, now long passed away, who at different times in the long ago filled important positions in the centers of learning, I would correct this error.

Mr. Espy was born in Pennsylvania, but when a mere infant his father removed to Kentucky. After a few years, having purchased a tract of land in the beautiful Miami Valley, he removed to Ohio. While a resident of Kentucky his eldest daughter married Mr. Joseph Simpson, of Mount Sterling, brother to the late Judge Simpson of the Court of Appeals of that State, and with this sister James Espy remained, for better advantages of education that could be secured at that time in Ohio, and was "at eighteen" a student at Transylvania University in Lexington.

James Espy did not graduate, at least we have no record to that effect, but, after a few years of close application, joined his family in Ohio and commenced the study of law while teaching school in Xenia. He was then near 23 years of age. His love for teaching amounted to enthusiasm, and although he completed his law studies he finally abandoned the idea of choosing the law as his profession, and determined to follow the bent of his inclination and become a conscientious instructor of youth.

When Mr. Espy was about 25 years of age he decided to return to his native State, where he felt he could avail himself of more abundant facilities for the acquirement of scientific knowledge, from early youth a strong craving of his nature. He went at once to Bedford, and through the influence of his relatives there was appointed principal of the academy at Cumberland, Md., which position he filled with credit to himself, and satisfaction to the intelligent board of trustees.

During the first few years succeeding the establishment of the Smithsonian Institute, Professor Henry and Professor Espy were intimately associated as co-regents[1] in its management, and between them there always existed a warm friendship. It is not many years since the writer of this sketch sat by Professor Henry at a charming dinner on K street,

[1] Neither Henry nor Espy was a regent.—*C. A.*

opposite the beautiful Franklin Square, when after some pleasant reminiscences of their old association the genial old professor remarked: "There is no question in my mind but that Professor Espy should be regarded as the father of the present Signal Service of the United States,[2] his theory of storms having led the way to its establishment and present success," adding that the charts now used in the service were identical (with some slight modifications)[3] with those the old Storm King constructed for use in the Meteorological Bureau of the War Department when he was at its head. This interview occurred in 1875. General Myer, "Old Probabilities," as he was called, made a similar statement to the writer.

The mineral springs at Bedford, so fashionable a resort 50 years ago, are situated about one mile from the village, and were often visited by Professor Espy during the many years of his residence in Philadelphia, where he taught a classical school while investigating the phenomena of the forces of the atmosphere which led to his discovery of "The Theory of Storms."

An old friend of the professor, a fellow-scientist, who visited him often at his home on Chestnut street, described to the writer his method of pursuing his atmospheric calculations, which necessarily must be carried on out of doors. The fence inclosing the small yard was of smooth plank, painted white; the yard was filled with vessels of water and numerous thermometers for determining the "dew-point". The white fence, when the narrator saw it, was so covered with figures and calculations that not a spot remained for another sum or column.

In 1839 Mr. Espy visited England for the purpose of presenting his theory of storms before the British Association of Science. Sir John Herschel, with other eminent scientists, was present and received him with cordial greetings and warm appreciation. He spent several weeks most delightfully in many of the "stately homes" of that country, where he and his wife were agreeably entertained. In the autumn of the same year he visited Paris, where a committee had been appointed by the Academy of Science to receive him, presided over by the illustrious Arago, who was enthusiastic in his reception of the storm theory, as presented to them in several lectures by its discoverer. In his address of welcome, Arago remarked that "England had its Newton, France its Cuvier, and America its Espy." Students of nature are usually of serene and happy temperament, and Mr. Espy was no exception to the rule. He never seemed impatient or concerned at the slow recognition of his discoveries as means of practical use in commerce or other national needs. He would say, "I leave all this to the future, sure that its adaptations to the uses of life must one day be seen and acknowledged." He left no children, and but few are now living of his near relatives, but those few remember with reverence the broad charity and earnest purpose of the "Storm King."

LECTURES ON METEOROLOGY.

Referring to a gentleman who desires material to enable him to give a lecture on meteorology, one of our best section directors quotes the State School Commissioner to the effect that the teachers and children of the State should be protected from lectures or instruction of the character contemplated by the proposed lecturer.

This remark may apply possibly to many others. Errors are disseminated by public lecturers quite as easily as by books or any other method. It is impossible but that errors should exist and be propagated, like noxious weeds, but the wiser commissioners of education, school commissioners, or other authorities do the best they can to secure the best available teachers and lecturers. The great demand for such instruction in meteorology will be realized when we consider that in one single State alone there will be held 50 teachers' institutes during August, 1906, and other States will hold as many, or even more. Therefore incomplete and inaccurate teaching is inevitable. The Weather Bureau can not supply the intense demand for lecturers during the summer season, although the Chief will do the very best he can. Our best school books probably contain errors relating to meteorology, but they do not attempt to answer the innumerable questions, sometimes very foolish and unnecessary, that are asked by the teachers and the scholars whenever they come in personal contact with an intelligent meteorologist.

We hope that some of our best men may have time to prepare lectures to be sent in typewritten copies, or newspaper print, to many educational centers, where they may be delivered orally, precisely as has been done for many years past with great success in the State of New York.

In other cases some of our best men might well take two months' furlough in the summer and devote themselves wholly to the work of the teachers' institutes. They would probably reach several hundred persons every day of the week, and disseminate valuable information among the teachers, which would be retailed to the tens of thousands of scholars.

[2] There are many others who have equal claims to be called "fathers" of the beneficent Weather Bureau.—*C. A.*

[3] These modifications are very important and fundamental.—*C. A.*

HAILSTORM IN THE BAHAMAS.

On page 260 of the MONTHLY WEATHER REVIEW for June, 1905, we published some account of a hailstorm on April 18 in the island of Spanish Wells, about fifty miles west of Nassau, an event that was said to have been very local and entirely phenomenal. The following note relates to a similar hailstorm, 60 miles east of Nassau. From these two reports it is reasonable to infer that local hailstorms are no rarer in that region than in many other parts of the world. Such storms are always local, and there is but small chance that they will frequently visit any locality, such as the small individual islands of the sparsely inhabited Bahamas. Nothing but a faithful record for many years would justify any attempt at determining the relative frequency of these local hailstorms. Our own impression is that a given square mile of territory anywhere in the United States east of the one hundredth meridian is about as liable to experience a severe hailstorm as it is to experience a disastrous tornado, and that is to say about once in a thousand years.

NOTE BY P. H. BURNS, SUPERINTENDENT BAHAMAS CABLE.

On Sunday morning, February 14, 1906, between midnight and one o'clock a. m., a severe hailstorm visited Governours Harbour, Eleuthera, about sixty miles east of Nassau. A report from the Resident Justice of that settlement states that "it rained very hard for a half hour, with moderate wind from east. The wind then freshened and veered to southeast when hail began falling very heavy and lasted about fifteen minutes. The wind then fell some and shifted to the southwest with renewed rain. Next morning the effects of the hail could be seen on buildings and trees and it was on the ground in some places about six inches. A number of small birds were killed. The hailstorm did not extend for more than a quarter of a mile around the town. Nearby cultivated areas were slightly damaged. Rainfall 1.75 inches."

A FAKE RAIN MAKER.

Mr. Otto J. Klotz, the Chief Astronomer of the Dominion of Canada, and a very active friend of honest meteorology, kindly sends the following extract from The News, of Toronto, March 3, 1906. We know of no better way to protect the public than to expose the pernicious activity of the fake rain makers, the hail preventers, and the planetary forecasters:

Ottawa, March 3.— In the appropriation ordinance passed last autumn by the Yukon Council appears a vote of $5000 for the purpose of "encouraging meteorological experiments on the Dome"—the peak which dominates the vicinity of Dawson—"in the summer of 1906." This innocent item covers one of the quaintest pieces of administration ever perpetrated by a Canadian legislative body.

The rainfall is an important consideration in the Yukon, as the miners need water for their operations, and a wet summer is as advantageous as a dry one is the reverse. So far as observations extending over a very few years can serve as an indication, wet and dry summers roughly alternate. The summer of 1905 was marked by a drought, so that the balance of probabilities is in favor of a rainy summer this year.

Southern California for some time has been the home of a rain maker, one Hatfield, whose method of operation seems to be the liberation of certain chemicals, which are supposed to induce showers. Mr. Hatfield has advertised his methods and his alleged successes with some enterprise, and the administration of the Yukon has become an admirer of his. The "meteorological experiments" are to be conducted by him, and the $5000 is for him.

STANDS TO WIN ANYWAY.

Private persons have subscribed $5000 and the Yukon Council supplies another $5000. Mr. Hatfield is to spend the summer in the country and his expenses, estimated at $2000, are to be defrayed in any event. If it rains, he is to get the other $8000. Thus Mr. Hatfield occupies an advantageous position in the bargain. He will get $2000 expense money in any event, and he will get $8000 more, (1) if he "makes" the rain, or (2) if the rain happens to come independently of his liberation of chemicals.

Moreover, as already noted, in any event the chances favor rain this summer.

Next, who is Mr. Hatfield? The standing of the United States Weather Bureau at Washington can not be doubted. A request for information, addressed to the Bureau, elicited the following reply:

"Mr. Hatfield attained considerable notoriety in the United States last fall as a pretended rain maker, operating in southern California. The judgment of the Weather Bureau as to this pretension may be found in the accompanying extract contained in the closing paragraph of a letter written by the Chief of the Bureau, October 20, 1905, in reply to a request for information relative to Mr. Hatfield:

"It is, therefore, apparent that the rainfall which was supposed to have been caused by the liberation of a few chemicals of infinitesimal power was simply the result of general atmospheric conditions that prevailed over a large area. It is hoped that the people of Kansas and of other regions in the subarid West will not be misled in this matter, and give undue importance to experiments that doubtless have no value. The processes which operate to produce rain over large areas are of such magnitude that the effects upon them of the puny efforts of man are inappreciable."

In another letter on the subject, to be found in the issue of the MONTHLY WEATHER REVIEW for April, 1905, Mr. Willis L. Moore, the Chief of the United States Weather Bureau, corrected some statements put forward on Mr. Hatfield's behalf. "Your dispatch," he wrote, "stated that the heaviest rain fell in the region of the rain maker, and that the rainfall had not been large in any of the other regions of the subarid West. This statement is erroneous, as during the same period general and excessive rains occurred throughout Arizona and New Mexico. It is known that when barometric pressures for a month are low in the Southwest, the period is one of frequent and heavy rains in that region, and this barometric condition prevailed over New Mexico, Arizona, and southern California during the 3-month period under consideration."

It is rather disagreeable to reflect that at the very time that these warnings were being issued against Mr. Hatfield, the administration of the Yukon was proving so easy a mark for his efforts. What makes this the more striking is that the Yukon Council is not a particularly democratic institution. It is a strongly official body, perhaps a majority of its members being selected from Ottawa—presumably on account of their intelligence, general information, and administrative fitness.

OUTLINE FOR THE STUDY OF METEOROLOGY IN THE NEW YORK STATE NORMAL SCHOOL.

The Education Department of the State of New York gives considerable attention to the study of meteorology, as a part of the course in geography. The special development of this subject, at the State Normal and Training School in Oswego, is explained by Prof. Amos W. Farnham in the Journal of Geography for February, 1906. We select the following items from his schedule of the study of that subject.

After a series of studies on the earth as a planet, covering the subject of its shape and motion, there comes the section bearing on the gaseous atmosphere, to be followed by physiography, and commercial and political geography. We condense Section II as follows:

II. The gaseous envelope.
- A. Atmosphere. 1. Origin. 2. Function.
- B. Composition. 1. Oxygen. 2. Nitrogen. 3. Carbon dioxide. 4. Water vapor. 5. Dust—inorganic and organic. 6. "Precious" gases (argon, krypton, helium).
- C. Temperature—degree of heat. 1. Measurement of temperature. 2. Heat. 3. Various elements affecting temperature. 4. Isotherms. Isothermal charts studied. Heat equator, cold pole. 5. Thermograph. 6. Heat belts—their areas and boundaries by isotherms.
- D. Pressure and density. 1. Relation of pressure to density. 2. Relation of density to temperature. 3. Density diminished by diminished gravity, by increased temperature, and by increased amount of water vapor. 4. Measurement of pressure.
- E. Movements of air—currents. 1. In vertical plane. 2. In horizontal plane—wind. 3. Origin of currents—unequal density of adjacent masses. 4. Classification of winds; planetary; cyclonic winds; tropical hurricanes; western tornadoes; diurnal winds; seasonal winds—monsoons. 5. Deflection of winds—Ferrel's law. 6. Velocity—measured by anemometer. 7. Classification of winds based on velocity.
- F. Humidity—measured by hygrometer. 1. Absolute and relative. 2. Condensation; causes; forms; distribution—unequal.

CORRIGENDUM.

MONTHLY WEATHER REVIEW for December, 1905, Vol. XXXIII, page 535, column 2, in Table 1, year 1882, losses paid, for "52,112" read "52,122."

FORECASTS AND WARNINGS.

By Prof. E. B. GARRIOTT, in charge of Forecast Division.

During the first half of February a succession of areas of low barometric pressure of moderate intensity crossed the British Isles, two well-defined disturbances moved from the southeastern portion of the Gulf of Mexico northeastward near the Atlantic coast line of the United States, and three areas of high barometer of great magnitude, attended by pronounced cold waves, advanced from the British Northwest Territory to the Atlantic coast. About the middle of the second decade of the month the succession of barometric depressions over the Eastern Atlantic Ocean became slow, and during the latter portion of that decade pressures fell over the Azores, and stagnated barometric conditions and high temperatures set in over the United States east of the Rocky Mountains. The closing days of February were marked by rapid and pronounced weather changes over the United States and in the higher latitudes of the North Atlantic Ocean.

The month was warmer than usual over the Great Plains and thence to the Pacific coast and also over a great portion of the upper Lake region and New England, the departures above the normal exceeding 9° on the northeastern slope of the Rocky Mountains. In the Ohio and middle and lower Missippi valleys and thence to the Gulf and middle and south Atlantic coasts, monthly mean temperatures were below the normal.

Precipitation was irregularly distributed, both as regards amounts and departures from the normal.

The paths of the more important areas of low barometric pressure, or general storms, of February are traced on Chart III.

The first storm of the month advanced from the eastern portion of the Gulf of Mexico to Nova Scotia during the 8th and 9th, attended by heavy rain in the east Gulf and South Atlantic States, by snow in the Middle Atlantic and New England States, and by high easterly shifting to northwest winds along the middle Atlantic and southern New England coasts. During the 12th and 13th high winds off the Atlantic coast attended the northeastward advance of a disturbance from the Florida Peninsula. Three disturbances moved eastward from the extreme north Pacific coast during the second decade of the month, their influence in the United States being shown mainly in the warm southerly winds that prevailed over the northern districts from the 15th to 20th. Low area XII, that moved from British Columbia to the Carolina coast from the 24th to 28th, was attended by heavy snow from the middle Mississippi Valley over a great part of the Ohio Valley and in southern portions of the Middle Atlantic States. During the 27th and 28th a disturbance of marked strength advanced eastward over the middle Plateau and middle Rocky Mountain regions.

The first well-defined cold wave of the winter of 1905–6 advanced from Manitoba to the Atlantic coast from the 1st to 3d, with temperature 30° below zero at Winnipeg, Man., on the 1st, and 24° below zero at Sault Ste. Marie, Mich., on the 2d. On the morning of the 3d the temperature was below zero in the interior of New York and New England, the line of 10° was traced through the District of Columbia and southwestern Virginia, and the line of freezing temperature through northwestern Florida. From the 3d to 6th a cold wave advanced from the Rocky Mountains over the central valleys and the Middle Atlantic and New England States, carrying the line of zero temperature to Kansas, the Ohio River, and the interior of New York and New England. From the 13th to 15th a cold wave swept from British America to the Atlan-

tic and Gulf coasts, with zero temperatures in the States of the lower Missouri Valley on the morning of the 14th, and a fall in temperature of 20° to 30° in the interior of the Atlantic and east Gulf States by the morning of the 15th. A moderate cold wave overspread the central valleys and the Eastern and Southeastern States during the 26th, 27th, and 28th, attended by frost to the middle and east Gulf coasts and northern Florida.

BOSTON FORECAST DISTRICT.

The month as a whole was less severe than the average February. Marked cold waves occurred on the 3d and 6th, during which the temperature fell almost to zero in the southern portions, and 20° to 36° below zero in interior and northern portions, of New England. The temperature was also very low at the close of the month. Snowfall was light to moderate and occurred chiefly on the 9th and 10th. At the close of the month snow lay only in the woods and on northern hillsides. From the 26th to 28th gales of great force prevailed, the wind reaching velocities of 40 to 70 miles an hour at coast stations. During this storm several vessels were beached, but without great damage or loss of life; incoming vessels reported that the storm was of unusual severity at sea. Due announcement of the approach of the storm was given by the Weather Bureau, and the press commended the Bureau for the timely warnings to shipping and other interests.—*J. W. Smith, District Forecaster.*

NEW ORLEANS FORECAST DISTRICT.

Timely warnings were issued for all cold waves, and for freezing temperatures and frosts that occurred in the sugar and trucking districts. A pronounced cold wave reached Oklahoma and the northern part of Texas on the 4th, and crossed the district on the 7th. A second cold wave visited the northern portion of the district on the 14th and 15th. Storm warnings were issued on two dates for the Texas coast, and verifying velocities occurred at Galveston.—*I. M. Cline, District Forecaster.*

LOUISVILLE FORECAST DISTRICT.

Six general disturbances of more or less severity affected the weather conditions of Kentucky and Tennessee. Heavy snow on the 4th was followed by a prolonged cold spell, during which temperatures below zero were reported over a large portion of Kentucky. General rains and high winds on the 13th and 14th were followed by a cold wave of short duration. Heavy rains fell on the 20th and 21st, and heavy showers and thunderstorms occurred on the 23d and 24th. On the 26th and 27th showers and some thunderstorms were followed by the heaviest snowfall of the winter. In western and southern Kentucky the snowfall ranged from four to six inches, and in the north-central portion of the State six to twelve inches fell. In Tennessee the precipitation was mostly in the form of rain. Cold-wave warnings were issued the night of the 3d and the morning of the 4th; also the afternoon of the 13th and the morning of the 14th.—*F. J. Walz, District Forecaster.*

CHICAGO FORECAST DISTRICT.

The month, as a whole, was mild over the greater portion of the Middle Western and Northwestern States, and there were no considerable falls of snow or especially severe storms. Advisory messages were sent to open ports on Lake Michigan several times during the month in anticipation of high winds. No casualties of any kind were reported, and, because of the comparative freedom from ice, the traffic on the Lake was greater than is usual during February. With the exception of the 3d, when a marked cold wave appeared in the Northwest and swept thence southward and eastward, no general cold-wave warnings were ordered. On a few occasions cold-wave warnings were ordered for a portion of the district. Warnings hoisted on the 1st in the eastern portion were followed by a marked drop in temperature in that section. On the 13th warnings were ordered for a considerable portion of the district and a cold wave gradually advanced to its eastern limits, although no very low temperatures occurred.—*H. J. Cox, Professor and District Forecaster.*

DENVER FORECAST DISTRICT.

February was dry, except in Arizona and New Mexico and portions of northern Utah, and mild temperatures prevailed.

On the morning of the 3d loops of a deep northern low pressure area embraced the eastern slope of the Continental Divide, and twelve hours later a depression was central in southeastern Colorado, and a marked rise in pressure, with decided falls in temperature, had occurred in the extreme north. Cold-wave warnings were sent out early in the afternoon to points in Wyoming and eastern Colorado, and at night to eastern New Mexico. The warnings were fully verified in Wyoming and eastern Colorado.—*F. H. Brandenburg, District Forecaster.*

SAN FRANCISCO FORECAST DISTRICT.

The month, as a whole, was one of unsettled weather. A moderate disturbance on the 5th and 6th over the southern portion of California caused timely rain in moderate amounts south of the Tehachapi. On the 10th the first well-marked southeaster appeared on the northern coast of California; ample warning was given of the disturbance. Showery weather continued until the 14th, when a well-marked storm appeared on the coast of Washington, accompanied by high southerly winds and generous rainfall. On the 16th a coast storm moved slowly northward and eastward, and caused but little change in California. On the 20th the pressure fell rapidly on the coast, and a storm of considerable energy swept over the northern portion of California. The observer at Point Reyes Light reported a waterspout about three miles southwest of the station, forming at 4:58 p. m. and disappearing at 5:02 p. m. Heavy snow fell in the mountains during the passage of this storm. On the 26th another marked depression moved eastward, and caused general rain throughout northern California. Frost warnings were ordered for the interior of California on the morning of the 28th.—*A. G. McAdie, Professor and District Forecaster.*

PORTLAND FORECAST DISTRICT.

The month averaged warmer than usual; no cold waves occurred and no cold-wave warnings were issued. Fair weather prevailed in Washington and Oregon from the 1st to the 14th. A stormy period then began, which continued until the close of the month, the highest winds occurring on the 18th, 19th, and 24th. Warnings for all storms were issued.—*E. A. Beals, District Forecaster.*

RIVERS AND FLOODS.

There was but little high water of consequence and no abnormally low water during the month. The heavy and warm rains of the 23d and 24th over northern Illinois caused moderate floods, with danger-line stages, in the Illinois River from the 26th to the 28th, inclusive, for which warnings were issued on the 25th. Rock River was also in flood at the same time, causing considerable damage in Whiteside County, Illinois.

The rivers of eastern South Carolina were slightly above the danger line throughout their lower portions from the 2d to the 4th, inclusive, but no damage was reported.

At the end of the month the Missouri River was open as far northward as Yankton, S. Dak., and the Mississippi as far as Leclaire, Iowa. There was a considerable increase in the quantity of ice during the first three weeks of the month, but the warm weather of the last week made serious inroads upon it. About the middle of the month floating ice was observed in the Mississippi River as far south as New Madrid, Mo. In New England there was a slight increase in the thickness of the ice during the month, but throughout all districts there were from four to twenty inches less ice on the last day of the month than on the corresponding date of the previous year.

The highest and lowest water, mean stage, and monthly range at 291 river stations are given in Table VI. Hydrographs for typical points on seven principal rivers are shown on Chart I. The stations selected for charting are Keokuk, St. Louis, Memphis, Vicksburg, and New Orleans, on the Mississippi; Cincinnati and Cairo, on the Ohio; Nashville, on the Cumberland; Johnsonville, on the Tennessee; Kansas City, on the Missouri; Little Rock, on the Arkansas; and Shreveport, on the Red.—*H. C. Frankenfield, Professor of Meteorology.*

CLIMATOLOGICAL SUMMARY.

By Mr. JAMES BERRY, Chief of the Climatological Division.

SUMMARY OF TEMPERATURE AND PRECIPITATION BY SECTIONS, FEBRUARY, 1906.

In the following table are given, for the various sections of the Climatological Service of the Weather Bureau, the average temperature and rainfall, the stations reporting the highest and lowest temperatures with dates of occurrence, the stations reporting greatest and least monthly precipitation, and other data, as indicated by the several headings.

The mean temperatures for each section, the highest and lowest temperatures, the average precipitation, and the greatest and least monthly amounts are found by using all trustworthy records available.

The mean departures from normal temperature and precipitation are based only on records from stations that have ten or more years of observation. Of course the number of such records is smaller than the total number of stations.

Section.	Temperature—in degrees Fahrenheit.							Precipitation—in inches and hundredths.					
	Section average.	Departure from the normal.	Monthly extremes.					Section average.	Departure from the normal.	Greatest monthly.		Least monthly.	
			Station.	Highest.	Date.	Station.	Lowest.	Date.			Station.	Amount.	Station.	Amount.
Alabama	45.6	— 0.7	Lucy	75	24	Oneonto	11	3	2.39	—3.22	Mobile	4.87	Decatur	1.15
			Selma	75	26									
Arizona	51.6	+ 2.5	3 stations	89	3 dates	St. Michaels	14	3	1.29	+0.15	Huachuca Reservoir.	4.44	Prescott	0.13
Arkansas	41.8	+ 0.1	8 stations	75	5 dates	Dodd City	— 7	5	2.21	—1.62	Luxora	4.00	Arkansas City	0.87
California	52.0	+ 3.9	Hanford	94	27	Tamarack	—11	25	4.88	+1.35	Monumental	22.27	Salton	0.00
Colorado	29.7	+ 4.9	Lamar	82	21	Gunnison	—29	8	0.35	—0.55	Hahns Peak	1.63	8 stations	T.
Florida	58.8	— 1.6	Flamingo	85	26	Molino	23	1	2.78	—1.10	Jupiter	6.44	Eustis	0.76
Georgia	46.6	+ 0.3	Fleming	82	24	Clayton	12	3	2.07	—3.68	Glenville	4.27	Gainesville	0.21
Hawaii	68.8‡		3 stations	88	4 dates	Humuula, Hawaii	29	2	1.48‡		Nahiku, Maui	9.27	2 stations	0.00
Idaho	29.6	+ 1.5	Garnet	60	18	Soldier	—22	8	1.97	+0.16	Landore	5.67	Chesterfield	0.46
Illinois	28.6	+ 2.4	Cobden	76	19	Flora, Windsor	—15	7	2.16	—0.15	Carrollton	4.45	Paris	0.65
Indiana	28.7	— 0.5	Mount Vernon	72	23	Bluffton, Kokomo	—19	7	1.33	—1.55	Hammond	3.30	Lima	0.40
Iowa	23.6	+ 4.2	Red Oak	66	22	Inwood	—32	10	1.29	+0.28	Mount Pleasant	2.91	2 stations	0.20
Kansas	35.8	+ 5.6	Farnsworth	81	28	4 stations	— 4	5,9	0.77	—0.34	Pleasanton	2.68	Lakin	0.02
Kentucky	34.7	+ 0.1	Highbridge	75	23	Anchorage	—12	7	1.81	—1.96	Marion	2.46	Anchorage	1.00
			Jackson	75	24									
Louisiana	50.0	— 2.1	Lake Charles	84	24,26	Georgetown	17	9	2.98	—2.01	Abbeville	5.88	Robeline	0.40
Maryland and Delaware	33.2	+ 2.3	3 stations	68	14	Deer Park, Md.	—15	3	2.55	—0.91	Princess Anne, Md.	6.57	Westernport, Md	0.46
Michigan	20.8	+ 1.9	Coldwater	64	21	Humboldt	—36	15	1.50	—0.46	St. James	4.52	Iron River	0.20
			Dundee	64	23									
Minnesota	13.8	+ 2.6	Lynd (Gregg)	58	19	Bagley	—47	14	0.28	—0.43	Grand Meadows	1.42	Mount Iron	0.01
Mississippi	45.9	— 2.0	3 stations	81	24,25	Watervalley	11	6	1.93	—3.25	McNeill	4.76	Patmos	0.75
Missouri	33.7	+ 3.1	Versailles	73	22	Ironton	—13	7	2.28	—0.14	Sublett	4.40	Conception	0.85
			Warsaw	73	22									
Montana	26.8	+ 6.3	Fort Logan	70	17	Ridgelawn	—34	13	0.70	+0.02	Cooke	5.20	2 stations	T.
			St. Pauls	70	24									
Nebraska	29.4	+ 6.1	Beaver City	73	28	Winnebago	—24	15	0.64	—0.02	Dawson	2.68	2 stations	T.
			Culbertson	73	28									
Nevada	36.4	+ 5.0	Fallon	69	26	Clovervalley	2	4	1.03	—0.30	Lewers Ranch	3.90	Wadsworth	0.00
			Martins Ranch	69	26									
New England*	24.5	+ 1.1	Boston, Mass	63	21	Enosburg Falls, Vt.	—36	6	2.53	—1.26	Plymouth, Mass	5.33	Thomaston, Me.	0.90
New Jersey	30.9	+ 0.3	Clayton	64	24	Layton	—12	11	2.58	—1.35	Woodbine	3.85	Asbury Park	1.77
New Mexico	39.2	+ 2.2	Monument	79	20	Vermejo	— 1	5	0.69	+0.08	Magdalena	2.11	3 stations	T.
New York	22.8	+ 0.9	Hunt	75	24	De Kalb Junction	—33	6	1.63	—1.17	Spier Falls	4.00	Atlanta	0.25
						Faust	—33	6						
North Carolina	41.5	+ 0.5	Washington	78	20	Linville	2	3	3.22	—1.27	Washington	8.44	Lenoir	0.36
North Dakota	9.8	+ 2.8	Sentinel Butte	57	20	Wishek	—38	14	0.13	—0.36	New England	0.80	10 stations	T.
Ohio	27.3	+ 0.2	Bucyrus	72	23,24	Medina	—23	6	1.16	—1.48	Ironton	2.76	Rocky Ridge	0.49
			Clarington	72	24									
Oklahoma and Indian Territories.	41.0	+ 3.2	3 stations	86	24,25	Fort Reno, Okla	— 5	5	0.71	—0.57	Harishorne, Ind. T.	3.28	Jefferson, Okla	T.
Oregon	39.4	+ 2.0	Forest Grove	72	10	Burns	— 7	5	5.27	+0.12	Buckhorn Farm	15.77	Vale	0.20
						Granite	— 7	3						
Pennsylvania	28.0	+ 0.8	Derry Station	79	24	Franklin	—21	6	1.70	—1.40	Girardville	3.80	Indiana	0.36
						Saegerstown	—21	6						
Porto Rico	73.7		Central Aguirre	98	11	Aibonito	43	15	1.67		Rio Blanco	5.56	Guanica Central	0.05
South Carolina	46.0	— 0.7	Walterboro	76	20	Liberty	12	5	2.58	—2.20	Georgetown	7.26	Greenville	0.96
South Dakota	21.4	+ 6.8	Armour	71	19	Ipswich	—37	14	0.34	—0.19	2 stations	1.70	Cherry Creek	T.
			Greenwood	71	19									
Tennessee	39.0	— 0.4	Springdale	76	20	Union City	0	7	1.26	—3.19	Andersonville	2.90	Franklin (near)	0.24
Texas	48.8	— 0.6	Fort Ringgold	91	24	Claude	5	4,5	1.86	+0.19	Clarksville	5.31	Claude	0.02
Utah	33.7	+ 3.5	Rockville	84	27	Fort Duchesne	—15	8	0.88	—0.28	Farmington	2.56	Green River	0.00
Virginia	36.7	+ 0.9	Arvonia	73	24	Burkes Garden	— 2	3	1.76	—1.77	Spottsville	5.62	Hot Springs	0.32
Washington	38.6	+ 3.1	Loverings Ranch	69	3	Cusick	0	5	3.17	—0.34	Union City	11.74	Wenatchee (near)	0.59
West Virginia	32.4	+ 1.5	Sutton	79	24	Parsons	—11	3	1.60	—1.78	Weston	3.34	Durbin	0.46
						Spencer	—11	28						
Wisconsin	17.2	+ 1.2	Sturgeon Bay	58	23	Prentice	—41	5	0.83	—0.41	Shullsburg	2.18	Downing	T.
Wyoming	23.8	+ 4.5	Wheatland	72	22	Jackson	—33	7	0.82	—0.31	Upper Geyser Basin, Y. N. P.	3.71	2 stations	T.

* Maine, New Hampshire, Vermont, Massachusetts, Rhode Island, and Connecticut. † 48 stations, with an average elevation of 625 feet. ‡ 147 stations.

THE WEATHER OF THE MONTH.

By Mr. WM. B. STOCKMAN, Chief of the Division of Meteorological Records.

The contour of the isobars of the mean sea-level pressure for the month does not materially differ from that of the normal, but in the area of greatest pressure the values are .15 inch, or more, above normal, and over the eastern portion of the upper and the lower Lake region the positive departures are still greater.

The mean pressure of the month increased over that of January, 1906, except over the Plateau and Pacific regions.

As a rule, the increases were marked, amounting to +.20 to +.25 inch over the upper Lake region, the northern portion of the upper Mississippi Valley, and eastern Minnesota. The decrease was most marked over portions of the middle and southern Plateau regions, but did not exceed —.15 inch.

Maximum temperatures varying from 80° to 84° occurred in central Florida, central Louisiana, the lower Rio Grande Valley and central Texas, south-central Indian Territory, southwestern Arizona, and portions of southern California.

Minimum temperatures of zero, or lower, occurred as far south as latitude 37° over the States between the Rocky and Allegheny mountains. Temperatures 40° below zero occurred in north-central Minnesota.

The precipitation was greatest in the middle and north Pacific regions, and on the southeastern coast of Florida.

Average temperatures and departures from normal.

Districts.	Number of stations.	Average temperatures for the current month.	Departures for the current month.	Accumulated departures since January 1.	Average departures since January 1.
		°	°	°	°
New England	9	26.7	+ 0.7	+ 7.4	+ 3.7
Middle Atlantic	13	32.7	— 1.8	+ 4.6	+ 2.3
South Atlantic	10	46.2	— 2.7	+ 0.1	0.0
Florida Peninsula *	8	60.5	— 2.0	— 1.2	— 0.6
East Gulf	8	48.5	— 4.8	— 4.0	— 2.0
West Gulf	7	48.9	— 2.7	+ 0.2	+ 0.1
Ohio Valley and Tennessee	12	34.0	— 3.6	+ 2.2	+ 1.1
Lower Lake	8	25.7	— 0.9	+ 7.8	+ 3.9
Upper Lake	10	19.7	+ 0.3	+ 9.0	+ 4.5
North Dakota *	8	10.3	+ 3.8	+ 11.2	+ 5.6
Upper Mississippi Valley	13	24.5	— 0.3	+ 7.2	+ 3.6
Missouri Valley	11	28.2	+ 3.7	+ 12.5	+ 6.2
Northern Slope	7	27.8	+ 6.7	+ 15.3	+ 7.6
Middle Slope	6	36.2	+ 3.8	+ 11.4	+ 5.7
Southern Slope *	6	42.2	+ 0.5	+ 3.7	+ 1.8
Southern Plateau *	13	46.7	+ 4.4	+ 5.9	+ 3.0
Middle Plateau *	8	33.1	+ 4.2	+ 4.4	+ 2.2
Northern Plateau *	12	33.1	+ 4.2	+ 8.6	+ 4.3
North Pacific	7	44.3	+ 3.7	+ 6.8	+ 3.4
Middle Pacific	5	53.5	+ 4.2	+ 6.9	+ 3.4
South Pacific	4	57.0	+ 3.5	+ 6.1	+ 3.0

* Regular Weather Bureau and selected cooperative stations.

In Canada.—Prof. R. F. Stupart says:

The temperature was above the average in all portions of the Dominion, except locally over the Peninsula of Ontario, where it was either just average or very slightly below. The positive departures were strikingly marked in British Columbia and in the Northwest Provinces, especially in the southern portions of Alberta and Saskatchewan where they were from 11° to 15°. In the Maritime Provinces, also, the positive departure was considerable in several localities, Chatham, N. B., recording 6° and Charlottetown 7° above the average.

Average precipitation and departure from the normal.

Districts.	Number of stations.	Average.		Departure.	
		Current month.	Percentage of normal.	Current month.	Accumulated since Jan. 1.
		Inches.		*Inches.*	*Inches.*
New England	9	2.66	77	—0.8	—1.8
Middle Atlantic	13	2.52	74	—0.9	—1.8
South Atlantic	10	2.86	76	—0.9	—0.9
Florida Peninsula *	8	3.01	103	+0.1	+1.2
East Gulf	8	2.50	53	—2.2	—3.4
West Gulf	7	1.94	56	—1.5	—2.7
Ohio Valley and Tennessee	12	1.28	31	—2.9	—4.1
Lower Lake	8	1.00	37	—1.7	—2.8
Upper Lake	10	1.42	74	—0.5	+0.2
North Dakota *	8	0.15	27	—0.4	—0.1
Upper Mississippi Valley	13	1.44	78	—0.4	+0.5
Missouri Valley	11	1.09	92	—0.1	+0.1
Northern Slope	7	0.42	81	—0.1	—0.4
Middle Slope	6	0.43	52	—0.4	—0.7
Southern Slope *	6	0.51	56	—0.4	—0.7
Southern Plateau *	13	0.98	91	—0.1	—0.4
Middle Plateau *	8	0.75	60	—0.5	+0.2
Northern Plateau *	12	1.42	88	—0.2	—0.4
North Pacific	7	5.04	89	—0.6	—1.8
Middle Pacific	5	4.48	107	+0.3	+0.3
South Pacific	4	2.69	104	+0.1	+0.7

* Regular Weather Bureau and selected cooperative stations.

In Canada.—Professor Stupart says:

The precipitation was below the average everywhere except at Prince Albert, Saskatchewan, and in its immediate vicinity, and over a portion of Prince Edward Island and in Cape Breton. The negative departures in British Columbia and over a large portion of Ontario ranged from 1 to 2 inches, but elsewhere the deficiency was, as a rule, considerably less than an inch. Sydney, C. B., recorded by far the largest positive departure, amounting to 2.9 inches.

There was a marked absence of snowfalls during the month and practically no heavy snowstorms. There was no snow on the ground at the end of the month in many portions of British Columbia, the Northwest Provinces, and Ontario, and in other sections there was no great depth; Cariboo recorded 22 inches, northern Saskatchewan 9 to 12 inches, the northern portion of Ontario 6 inches to an extreme of 18 inches, Quebec a few inches in the west portion to 19 inches in the eastern portion, New Brunswick 12 inches locally, and elsewhere in the Maritime Provinces, from 5 to 9 inches.

Average relative humidity and departures from the normal.

Districts.	Average.	Departure from the normal.	Districts.	Average.	Departure from the normal.
	%			%	
New England	74	— 1	Missouri Valley	72	— 3
Middle Atlantic	71	— 3	Northern Slope	71	0
South Atlantic	72	— 4	Middle Slope	61	— 6
Florida Peninsula	84	+ 4	Southern Slope	60	— 8
East Gulf	70	— 6	Southern Plateau	61	+14
West Gulf	72	— 2	Middle Plateau	69	+ 9
Ohio Valley and Tennessee	70	— 4	Northern Plateau	78	+ 3
Lower Lake	77	— 3	North Pacific	82	+ 1
Upper Lake	79	— 3	Middle Pacific	80	+ 4
North Dakota	79	— 1	South Pacific	77	+ 8
Upper Mississippi Valley	78	+ 1			

Average cloudiness and departures from the normal.

Districts.	Average.	Departure from the normal.	Districts.	Average.	Departure from the normal.
New England	5.0	— 0.5	Missouri Valley	4.7	— 0.7
Middle Atlantic	4.6	— 1.0	Northern Slope	4.9	+ 0.1
South Atlantic	4.3	— 1.0	Middle Slope	4.2	— 0.2
Florida Peninsula	5.6	+ 1.0	Southern Slope	5.0	+ 0.2
East Gulf	4.8	— 0.7	Southern Plateau	4.5	+ 1.5
West Gulf	4.9	— 0.9	Middle Plateau	5.7	+ 0.9
Ohio Valley and Tennessee	4.7	— 1.5	Northern Plateau	6.5	— 0.2
Lower Lake	6.0	— 0.8	North Pacific	6.3	— 0.7
Upper Lake	5.9	— 0.4	Middle Pacific	7.0	+ 2.1
North Dakota	5.7	+ 0.6	South Pacific	6.0	+ 1.9
Upper Mississippi Valley	4.8	— 0.5			

Maximum wind velocities.

Stations.	Date.	Velocity.	Direction.	Stations.	Date.	Velocity.	Direction.
Atlanta, Ga	27	54	nw.	Nantucket, Mass	13	50	ne.
Bismarck, N. Dak	3	50	nw.	Do	28	60	ne.
Block Island, R. I	9	58	ne.	New York, N. Y	28	59	nw.
Do	28	59	nw.	North Head, Wash	15	58	se.
Cape Henry, Va	8	58	ne.	Do	16	52	se.
Do	12	62	n.	Do	17	54	se.
Do	13	56	n.	Do	18	64	se.
Do	27	62	nw.	Do	20	50	se.
Do	28	56	nw.	Do	21	54	se.
Chicago, Ill	3	54	sw.	Do	24	60	se.
Do	13	50	ne.	Do	26	66	se.
Do	14	52	ne.	Oklahoma, Okla	4	56	n.
Devils Lake, N. Dak	3	56	nw.	Do	20	50	nw.
Duluth, Minn	4	52	nw.	Do	26	52	nw.
Hatteras, N. C	13	55	n.	Do	28	50	s.
Do	27	59	n.	Point Reyes Light, Cal	13	60	sw.
Do	28	50	nw.	Do	14	70	s.
Madison, Wis	13	54	ne.	Do	20	55	s.
Memphis, Tenn	26	52	nw.	Do	27	56	nw.
Modena, Utah	28	60	sw.	Do	28	62	nw.
Mount Weather, Va	2	56	nw.	Sioux City, Iowa	3	50	nw.
Do	14	68	nw.	Southeast Farallon, Cal	14	56	s.
Do	15	52	nw.	Tatoosh Island, Wash	1	56	e.
Do	22	52	nw.	Do	13	56	e.
Do	25	54	nw.	Do	14	58	e.
Do	27	50	nw.	Do	18	70	sw.
Do	28	58	nw.	Do	19	55	sw.
Nantucket, Mass	9	54	e.	Do	26	55	sw.

DESCRIPTION OF TABLES AND CHARTS.

By Mr. WM. B. STOCKMAN, Chief of the Division of Meteorological Records.

For description of tables and charts see page 38 of REVIEW for January, 1906.

TABLE I.—*Climatological data for U. S. Weather Bureau stations, February, 1906.*

Stations.	Elevation of instruments.			Pressure, in inches.			Temperature of the air, in degrees Fahrenheit.										Mean wet thermometer.	Mean temperature of the dew-point.	Mean relative humidity, per cent.	Precipitation, in inches.			Wind.					Clear days.	Partly cloudy days.	Cloudy days.	Average cloudiness during daylight, tenths.	Total snowfall.
	Barometer above sea level, feet.	Thermometers above ground.	Anemometer above ground.	Actual, reduced to mean of 24 hours.	Sea level, reduced to mean of 24 hrs.	Departure from normal.	Mean max. + mean min. ÷ 2.	Departure from normal.	Maximum.	Date.	Mean maximum.	Minimum.	Date.	Mean minimum.	Greatest daily range.					Total.	Departure from normal.	Days with .01, or more.	Total movement, miles.	Prevailing direction.	Maximum velocity. Miles per hour.	Maximum velocity. Direction.	Maximum velocity. Date.					
New England.							26.7	+ 0.7											74	2.66	— 0.8								5.0		
Eastport	76	69	85	30.05	30.14	+ .16	23.6	+ 1.6	45	21	31	—10	3	16	42	22	19	81	72	2.30	— 1.4	12	9,372	sw.	48	ne.	9	7	5	16	6.7	8.7
Portland, Me.	103	81	117	30.05	30.18	+ .16	24.2	— 0.4	50	21	32	— 5	3	16	36	22	16	72	72	2.00	— 1.5	6	6,860	n.	37	nw.	28	9	9	10	5.2	13.7
Concord	288	70	79	29.86	30.19	+ .15	23.4	0.0	56	21	34	— 5	3	12	39	.....	.....	...	...	1.34	— 1.9	6	4,083	nw.	30	nw.	28	14	6	8	4.2	11.0
Northfield	876	16	70	29.21	30.22	+ .18	16.2	+ 0.2	53	21	29	-21	6	4	43	12	9	80		2.18	— 0.2	8	5,792	s.	44	nw.	28	14	5	9	4.6	6.1
Boston	125	115	188	30.04	30.18	+ .14	29.7	+ 1.7	63	21	38	— 1	3	22	32	26	20	69		2.66	— 0.8	8	7,747	nw.	36	nw.	28	14	5	9	4.6	6.1
Nantucket	12	14	90	30.13	30.14	+ .10	33.0	+ 2.0	52	21	39	7	3	27	28	30	27	83		3.94	+ 1.1	10	11,493	n.	60	ne.	28	9	11	8	5.3	3.8
Block Island	26	11	46	30.14	30.17	+ .11	31.2	+ 0.4	50	21	38	5	3	25	30	28	24	75		4.39	0.0	6	13,030	nw.	59	nw.	28	10	10	8	5.0	1.8
Narragansett	.....	9	....	.....	.....	.....	29.6	+ 0.5	51	21	39	2	3	21	31	.....	.....	...		2.48	.....	5	.....	w.	.....	.....	..	14	8	6	....	2.0
Providence	160	57	67	30.00	30.19	+ .14	29.6	.....	62	21	39	1	3	21	32	25	20	71		2.88	.....	10	5,563	nw.	29	nw.	2	14	6	8	4.5	3.8
Hartford	159	122	132	30.02	30.20	+ .14	27.8	.....	53	21	37	0	6	18	32	23	17	67		2.30	.....	7	4,904	n.	34	sw.	4	12	7	9	5.2	9.9
New Haven	106	116	155	30.08	30.20	+ .13	29.4	+ 0.6	52	21	38	2	3	20	30	25	19	69		2.45	— 1.7	8	6,960	n.	41	n.	28	12	6	10	4.8	6.0
Mid. Atlantic States.							32.7	— 1.8											71	2.52	— 0.9								4.6		
Albany	97	102	115	30.12	30.24	+ .17	21.6	— 2.6	52	24	32	—10	6	12	40	19	14	77		2.09	— 0.6	6	5,519	nw.	32	s.	4	9	9	10	5.4	16.6
Binghamton	875	79	90	29.25	30.23	+ .15	22.8	— 1.1	60	24	33	—12	6	13	36	.....	.....	...		1.26	.....	7	4,424	e.	29	n.	28	9	5	14	6.3	9.3
New York	314	108	350	29.84	30.20	+ .12	31.2	— 0.3	59	21	38	5	6	24	30	28	23	72		2.57	— 1.2	6	9,664	nw.	59	nw.	28	14	3	11	4.5	5.0
Harrisburg	374	94	104	29.82	30.24	+ .15	29.2	— 3.3	54	24	37	4	6	21	25	26	20	70		2.10	— 0.7	7	5,382	nw.	28	nw.	28	12	7	9	4.6	10.6
Philadelphia	117	116	184	30.09	30.23	+ .13	33.6	+ 0.1	61	21	41	8	6	26	28	29	22	62		2.47	— 0.7	8	7,381	n.	43	nw.	28	12	7	9	4.5	6.2
Scranton	805	111	119	29.32	30.23	+ .15	25.4	.....	59	24	35	— 9	6	16	35	22	17	73		2.59	.....	8	5,021	sw.	30	nw.	28	7	13	8	5.9	16.9
Atlantic City	52	37	48	30.15	30.21	+ .10	32.7	— 1.2	52	19	40	8	6	25	26	30	25	76		3.66	+ 0.3	11	6,428	nw.	29	ne.	13	11	5	12	5.1	3.2
Cape May	17	48	52	30.21	30.23	+ .12	33.4	— 2.3	50	21	40	9	6	27	22	30	.....	...		3.19	— 0.6	10	7,169	n.	36	nw.	27	11	9	8	4.8	5.5
Baltimore	123	69	117	30.09	30.22	+ .11	34.2	— 2.0	61	14	42	8	6	26	28	29	21	62		2.21	— 1.3	7	5,543	nw.	27	n.	9	9	10	9	5.2	6.9
Washington	112	59	76	30.10	30.22	+ .11	34.0	— 1.8	64	14	43	7	6	25	34	29	23	69		2.14	— 1.2	7	5,484	nw.	36	nw.	2	18	3	7	3.6	10.1
Cape Henry	18	11	58	30.16	30.18	+ .07	39.2	— 4.7	67	14	46	20	3	32	29	.....	.....	...		4.04	+ 0.5	9	12,060	n.	62	nw.	27	12	9	7	4.5	3.0
Lynchburg	681	83	88	29.45	30.22	+ .11	38.4	— 1.6	70	20	50	13	3	27	40	32	26	70		1.14	— 2.4	6	3,624	nw.	24	nw.	27	18	5	5	4.0	4.8
Mount Weather	1,725	10	57	28.31	30.24	+ .13	27.8	.....	56	14	36	0	6	19	34	24	18	68		1.38	.....	7	12,712	nw.	68	nw.	14	18	2	8	3.6	10.5
Norfolk	91	102	111	30.10	30.21	+ .10	40.6	— 2.2	69	20	49	17	3	32	31	35	32	78		4.35	+ 0.5	8	7,137	ne.	38	n.	27	17	3	8	3.9	1.5
Richmond	144	145	153	30.08	30.25	+ .14	38.6	.....	69	14	48	12	3	29	33	.....	.....	...		2.57	.....	8	6,512	n.	38	n.	27	15	7	6	3.7	7.0
Wytheville	2,293	40	47	27.75	30.23	+ .11	34.6	— 0.5	66	24	46	6	3	24	37	28	24	76		0.33	— 3.0	7	4,196	w.	25	nw.	27	16	4	8	3.7	0.3
S. Atlantic States.							46.2	— 2.7											72	2.86	— 0.9								4.3		
Asheville	2,255	53	75	27.78	30.22	+ .09	38.0	— 2.1	65	22	49	11	3	27	34	32	28	76		1.04	— 2.6	7	6,509	nw.	38	nw.	27	14	9	5	3.9	T.
Charlotte	773	68	76	29.35	30.21	+ .09	43.4	— 1.6	68	20	53	17	3	34	26	35	27	58		1.65	— 2.9	8	5,523	ne.	33	w.	21	12	11	5	4.2	
Hatteras	11	12	47	30.15	30.16	+ .05	44.7	— 1.9	63	25	51	24	28	38	24	41	39	87		7.87	+ 3.4	7	12,235	ne.	59	n.	27	11	7	10	5.2	
Raleigh	376	71	79	29.79	30.21	+ .10	41.8	— 2.1	71	20	52	15	3	32	34	35	28	64		3.74	0.0	6	5,199	n.	26	nw.	25	19	2	7	3.4	T.
Wilmington	78	81	91	30.07	30.16	+ .04	46.0	— 3.8	74	25	56	20	3	37	29	39	34	71		2.89	— 0.3	6	5,913	n.	36	n.	12	15	5	8	3.8	
Charleston	48	14	92	30.12	30.17	+ .05	49.4	— 3.4	70	25	57	30	3	42	24	44	41	79		2.08	— 1.2	7	8,167	n.	43	n.	12	14	6	8	4.3	
Columbia, S. C.	351	41	57	29.80	30.20	+ .09	46.6	— 1.5	71	20	56	22	3	37	32	39	32	65		1.60	— 2.6	7	5,255	ne.	30	w.	21	14	7	7	4.4	
Augusta	180	89	97	29.99	30.19	+ .07	47.4	— 3.0	71	20	58	25	3	37	36	40	34	67		2.12	— 1.8	9	4,645	ne.	36	w.	27	14	8	6	4.0	
Savannah	65	81	89	30.11	30.18	+ .06	50.8	— 3.5	71	25	59	30	3	42	28	44	39	74		2.59	— 0.5	8	5,618	ne.	34	nw.	27	11	8	9	4.8	
Jacksonville	43	101	129	30.09	30.14	+ .02	54.3	— 4.1	75	24	62	33	28	47	21	49	47	83		3.06	— 0.1	7	7,080	ne.	44	n.	12	11	8	9	5.4	
Florida Peninsula.							64.9	— 2.2											84	3.97	+ 1.5								5.6		
Jupiter	23	10	48	30.06	30.09	+ .01	64.9	— 2.2	78	25	72	45	28	58	23	60	59	87		6.44	+ 3.8	9	7,180	n.	33	w.	27	3	20	5	5.5	
Key West	22	10	53	30.06	30.08	+ .01	68.4	— 3.0	78	20	73	58	28	64	13	64	62	83		3.78	+ 2.2	7	6,090	ne.	42	nw.	27	7	12	9	5.8	
Sand Key	25	40	71	30.04	30.07	.00	69.4	.....	79	25	73	60	28	66	12	.....	.....	...		1.60	.....	6	9,832	ne.	34	nw.	27	4	18	6	6.0	
Tampa	35	79	96	30.08	30.12	+ .02	61.3	— 1.5	78	24	70	40	28	53	27	55	52	81		1.69	— 1.4	6	5,687	ne.	34	w.	27	12	5	11	5.1	
East Gulf States.							48.8	— 4.8											70	2.50	— 2.2								4.8		
Atlanta	1,174	190	216	28.92	30.19	+ .07	44.4	— 3.6	69	22	54	20	28	35	29	38	31	66		0.56	— 4.1	10	9,324	nw.	34	nw.	27	14	7	7	4.0	1.2
Macon	370	55	66	29.80	30.20	+ .08	47.4	.....	72	24	58	27	28	36	38	.....	.....	...		2.44	.....	10	3,635	nw.	26	nw.	27	10	9	9	5.4	
Thomasville	273	8	57	29.87	30.18	+ .06	51.5	.....	76	24	63	29	3	40	32	.....	.....	...		2.86	.....	7	3,748	nw.	27	nw.	27	10	12	6	5.0	
Pensacola	56	79	96	30.12	30.18	+ .07	52.0	— 4.8	72	25	60	33	3	44	25	.....	.....	...		2.90	— 1.0	8	6,577	n.	31	nw.	27	11	10	7	5.1	
Anniston	741	8	58	29.42	30.24	+ .12	44.0	.....	71	23	56	19	3	32	38	.....	.....	...		1.52	.....	8	4,202	nw.	34	nw.	27	11	9	8	5.1	1.5
Birmingham	700	136	144	29.43	30.22	+ .10	45.4	— 3.8	70	23	55	24	3	35	31	.....	.....	...		1.88	— 2.4	7	5,799	n.	36	se.	24	12	8	8	4.7	
Mobile	57	98	106	30.12	30.18	+ .07	50.9	— 3.9	70	12	60	34	28	42	26	44	39	72		4.87	+ 0.2	11	5,423	n.	29	se.	13	9	10	9	5.1	
Montgomery	223	100	112	29.96	30.22	+ .10	48.2	— 4.5	72	23	59	27	3	38	33	42	38	76		3.80	— 1.5	9	4,795	n.	31	nw.	27	15	8	5	4.0	
Meridian	375	84	93	29.81	30.22	+ .11	45.7	— 7.9	73	26	57	25	7	34	36	.....	.....	...		2.29	— 3.3	7	3,947	n.	28	sw.	26	11	7	10	5.1	
Vicksburg	247	62	74	29.93	30.22	+ .12	49.0	— 3.6	76	24	59	23	7	39	27	41	33	60		1.45	— 3.2	5	5,000	ne.	36	nw.	26	15	8	5	4.1	1.6
New Orleans	51	88	121	30.13	30.19	+ .10	52.2	— 5.9	78	24	60	34	7	45	24	47	42	74		2.25	— 2.3	8	6,249	n.	34	nw.	27	9	8	11	5.3	
West Gulf States.							48.9	— 2.7											72	1.94	— 1.5								4.9		
Shreveport	249	77	84	29.95	30.23	+ .14	48.2	— 3.0	72	25	58	23	8	38	29	41	33	62		1.09	— 3.1	6	5,388	nw.	33	nw.	26	10	9	9	4.8	0.5
Fort Smith	457	79	94	29.72	30.21	+ .11	41.7	+ 0.2	72	22	52	10	5	32	31	36	30	70		2.02	— 1.6	7	6,329	e.	44	nw.	26	13	9	6	3.9	2.0
Little Rock	357	93	100	29.85	30.24	+ .13	42.6	— 2.8	70	22	52	13	5	33	30	36	28	61		2.07	— 3.3	6	5,942	ne.	42	s.	26	16	8	4	3.4	1.5
Corpus Christi	20	48	53	30.16	30.18	+ .13	54.8	— 4.2	76	24	61	30	5	49	27	51	48	82		1.38	— 1.1	11	5,819	n.	28	n.	4	4	12	12	6.6	0.1
Fort Worth	670	106	114	29.48	30.21	+ .14	47.0	.....	80	23	58	13	5	36	35	.....	.....	...		2.08	.....	4	7,810	s.	35	nw.	20	19	6	3	3.0	T.
Galveston	54	106	112	30.14	30.20	+ .13	53.0	— 4.0	75	24	57	30	7	48	24	50	49	92		2.92	— 0.1	7	7,929	se.	37	nw.	27	10	4	14	5.7	
Palestine	510	73	79	29.64	30.19	+ .11	48.6	— 2.4	74	25	58	22	5	39	34	43	38	71		3.06	— 0.4	8	5,477	ne.	30	n.	4	12	3	13	5.2	1.4
San Antonio	701	80	91	29.42	30.16	+ .11	53.2	— 2.6	78	24	63	28	5	43	35	46	41	68		1.07	— 0.9	8	4,690	se.	35	nw.	4	10	7	11	6.0	
Taylor	583	55	63	29.56	30.18	+ .12	50.2	.....	77	25	61	21	5	40	40	.....	.....	...		1.69	.....	4	5,895	n.	33	n.	4	10	9	9	5.4	1.3
Ohio Val. and Tenn.							54.0	— 3.6											70	1.88	— 2.9								4.7		
Chattanooga	762	106	112	29.41	30.24	+ .11	40.6	— 2.9	69	23	53	19	3	32	33	35	28	61		1.40	— 3.9	8	4,949	nw.	36	w.	27	12	8	8	4.7	0.2
Knoxville	1,004	35	88	29.14	30.22	+ .10	40.0	— 2.3	70	23	51	16	3	29	35	33	26	63		1.24	— 4.1	7	5,501	sw.	32	nw.	27	12	7	9	4.6	T.
Memphis	399	76	97	29.82	30.26	+ .15	41.7	— 3.1	71	23	50	13	7	33	31	37	31	68		1.31	— 4.0	8	6,956	ne.	52	nw.	26	15	5	8	4.0	0.4
Nashville	546	79	91	29.66	30.26	+ .14	38.8	— 3.9	68	23	49	10	7	28	30	33	25	62		C. 79	— 4.5	7	4,147	n.	26	w.	24	13	7	8	4.5	1.0
Lexington	989	75	102	29.15	30.26	+ .15	31.9	— 4.3	66	23	41	0	7	23	31	.....	.....	...		1.84	— 1.9	12	7,920	n.	36	w.	24	13	11	4	4.2	10.4
Louisville	525	111	132	29.67	30.27	+ .16	33.4	— 4.8	70	23	43	— 1	7	24	31	29	23	71		1.55	— 2.8	11	6,213	nw.	34	w.	24	13	9	6	4.2	9.1
Evansville	431	72	82	29.78	30.27	+ .16	33.0	.....	70	23	42	0	7	24	28	.....	.....	...		1.70	.....	9	5,530	ne.	36	s.	20	13	10	5	3.9	11.2
Indianapolis	822	154	164	29.33	30.25	+ .15	29.0	— 3.3	63	23	38	— 2	6	20	28	25	20	73		0.86	— 2.7	8	7,015	se.	39	s.	3	8	6	14	6.1	6.2
Cincinnati	628	152	160	29.56	30.27	+ .17	30.9	— 5.5	68	23	40	0	6	21	31	27	22	70		1.68	— 2.0	9	4,882	nw.	25	sw.	24	12	7	9	4.9	9.2
Columbus	824	173	190	29.34	30.25	+ .16	28.4	— 3.7	66	23	38	— 3	6	19	32	24	20	74		1.08	— 2.6	7	7,027	sw.	42	w.	25	10	8	10	5.2	5.0
Pittsburg	842	336	352	29.30	30.24	+ .15	28.9	— 4.5	70	21	39	— 3	6	19	35	25	20	73		1.09	— 1.7	8	6,809	nw.	35	nw.	2	8	7	13	6.0	4.9
Parkersburg	638	77	84	29.57	30.25	+ .15	31.6	— 4.7	72	24	42	0	6	21	37	27	23	78		1.34	— 2.3	11	4,167	n.	24	nw.	1	15	5	8	3.9	5.0
Elkins	1,940	41	50	28.10	30.26	+ .16	30.2	— 0.4	72	24	43	— 8	3	17	47	24	21	80		1.24	— 2.8	10	2,794	n.	29	s.	21	8	9	11	5.5	9.9
Lower Lake Region.							25.7	— 0.9											77	1.00	— 1.7								6.0		
Buffalo	767	178	206	29.34	30.21	+ .15	25.2	+ 0.7	67	24	34	— 2	2	17	36	22	18	77		1.41	— 1.4	19	10,086	sw.	48	sw.	4	3	14	11	6.2	9.9
Oswego	335	76	91	29.82	30.21	+ .15	23.2	— 1.4	59	24	32	— 9	6	15	29	21	18	83		0.97	— 1.6	15	8,864	s.	39	ne.	14	8	2	18	6.8	6.0
Rochester	523	81	102	29.62	30.22	+ .16	25.4	+ 1.0	70	24	34	— 3	2	17	33	21	17	77		0.68	— 2.0	11	6,374	sw.	29	w.	25	7	6	15	6.6	8.0
Syracuse	597	97	113	29.54	30.22	+ .15	22.9	.....	65	24	31	—17	6	14	36	.....	.....	...		0.76	.....	11	7,780	s.	43	s.	3	9	6	13	6.4	5.9
Erie	713	92	102	29.41	30.22	+ .15	26.2	— 1.3	67	24	35	— 2	6	18	36	22	17	71		0.96	— 2.5	11	8,233	s.	38	s.	3	11	7	10	5.3	7.1
Cleveland	762	190	201	29.37	30.23	+ .16	26.6	— 1.4	64	24	35	— 1	8	18	34	23	19	76		1.50	— 1.4	15	11,729	se.	48	nw.	1	7	12	9	6.0	13.4
Sandusky	629	62	70	29.53	30.24	+ .17	27.0	— 1.9	65	23	35	— 3	8	19	36	.....	.....	...		1.01	— 1.9	8	6,079	sw.	36	nw.	2	8	8	12	5.8	6.4
Toledo	628	120	127	29.53	30.24	+ .17	26.2	— 2.0	63	23	36	— 1	7	17	35	22	18	75		0.57	— 1.5	8	6,870	s.	37	s.	3	10	10	8	5.0	2.1
Detroit	730	153	193	29.41	30.24	+ .18	25.6	— 0.6	60	23	34	— 2	2	17	29	22	19	78		0.87	— 1.5	6	7,766	sw.	46	s.	3	8	9	11	5.9	1.6
Upper Lake Region.							19.7	+ 0.3											70	1.42	— 0.6								5.9		
Alpena	609	13	92	29.53	30.23	+ .20	19.2	+ 1.2	57	23	28	—10	15	10	32	17	14	84		1.50	— 0.5	12	7,763	nw.	45	s.	3	4	16	8	6.1	7.7
Escanaba	612	40	82	29.53	30.23	+ .17	16.6	+ 0.8	47	20	25	—11	6	8	30	15	10	78		0.71	— 0.9	7	7,451	sw.	38	ne.	13	8	10	10	5.5	6.8
Grand Haven	632	54	92	29.51	30.24	+ .19	23.0	— 2.0	48	19	31	— 7	6	15	32	21	17	80		2.55	+ 0.3	10	8,428	se.	46	s.	3	3	12	13	6.9	8.6

TABLE I.—*Climatological data for U. S. Weather Bureau stations, February, 1906*—Continued.

Stations.	Elevation of instruments.			Pressure, in inches.			Temperature of the air, in degrees Fahrenheit.								Mean wet thermometer.	Mean temperature of the dew-point.	Mean relative humidity, per cent.	Precipitation, in inches.			Wind.					Clear days.	Partly cloudy days.	Cloudy days.	Average cloudiness during daylight, tenths.	Total snowfall.
	Barometer above sea level, feet.	Thermometers above ground.	Anemometer above ground.	Actual, reduced to mean of 24 hours.	Sea level, reduced to mean of 24 hrs.	Departure from normal.	Mean max. + mean min. ÷ 2.	Departure from normal.	Maximum.	Date.	Mean maximum.	Minimum.	Date.	Mean minimum.	Greatest daily range.				Total.	Departure from normal.	Days with .01, or more.	Total movement, miles.	Prevailing direction.	Maximum velocity. Miles per hour.	Maximum velocity. Direction.	Maximum velocity. Date.				
Up. Lake Reg—Con't.																													
Grand Rapids	707	127	165	29.43	30.24	+.19	23.8	+ 0.4	56	20	32	— 6	6	16	29	21	18	79	2.05	— 0.5	6	7,624	s.	38	ne.	13	4	10	14	7.0	2.7
Houghton	668	66	74	29.45	30.22	+.17	14.7	.....	54	20	24	—20	7	5	44	...	...	...	1.69	.....	17	4,025	nw.	30	n.	3	3	10	15	7.1	21.8
Marquette	734	77	116	29.38	30.22	+.17	17.8	+ 0.7	51	20	25	— 4	5	10	27	15	10	76	1.52	— 0.3	12	9,001	nw.	48	s.	22	3	10	15	7.0	16.0
Port Huron	638	70	120	29.50	30.23	+.18	22.6	— 0.4	56	24	31	— 6	2	14	31	20	17	81	1.27	— 1.2	10	8,672	s.	42	s.	3	9	8	11	5.6	6.°
Sault Ste. Marie	614	40	61	29.50	30.24	+.21	13.3	+ 0.8	46	23	23	—28	5	3	42	12	10	85	0.53	— 0.8	13	5,550	se.	30	w.	21	11	5	12	5.6	4.
Chicago	823	140	310	29.32	30.25	+.17	27.6	+ 0.8	54	20	34	6	2	21	27	25	22	80	2.37	+ 0.1	12	10,460	s.	54	sw.	3	7	12	9	5.8	5.9
Milwaukee	681	122	142	29.48	30.26	+.20	24.0	+ 1.3	46	19	31	— 1	5	16	32	21	15	72	1.92	+ 0.1	8	7,992	n.	46	ne.	13	13	9	6	4.3	12.6
Green Bay	617	49	86	29.53	30.23	+.17	18.2	+ 2.0	44	23	27	—10	5	10	35	16	12	75	0.87	— 0.9	5	7,381	sw.	46	ne.	13	12	2	14	5.5	9.6
Duluth	1,139	11	47	28.92	30.22	+.14	10.8	— 2.7	46	19	21	—22	5	1	32	8	4	80	0.30	— 0.8	5	9,090	sw.	52	nw.	4	14	7	7	4.2	3.4
North Dakota.							**10.8**	**+ 3.6**										**79**	**0.14**	**— 0.5**									**5.7**	
Moorhead	940	8	57	29.18	30.27	+.16	8.0	+ 3.5	40	19	19	—31	14	—3	38	6	4	88	0.34	— 0.5	5	6,348	n.	34	nw.	3	11	9	8	4.9	3.2
Bismarck	1,674	15	57	28.35	30.24	+.12	12.2	+ 2.7	43	23	22	—28	14	3	39	9	2	64	0.06	— 0.5	3	6,344	nw.	50	nw.	3	4	18	6	5.5	0.6
Devils Lake	1,482	11	44	28.55	30.23	+.12	5.6	.....	43	19	17	—30	10	—6	39	4	0	78	0.06	.....	1	8,524	nw.	56	nw.	3	7	7	14	6.4	0.6
Williston	1,875	14	44	28.08	30.17	+.06	12.2	+ 4.5	49	21	24	—34	10	0	49	11	9	86	0.03	— 0.4	2	5,684	se.	41	nw.	3	7	12	9	5.9	0.3
Upper Miss. Valley.							**24.5**	**— 0.3**										**78**	**1.44**	**— 0.4**									**4.8**	
Minneapolis	.....	102	208	.....	.....	.....	16.2	0.0	48	22	26	—17	5	7	31	...	...	...	0.35	— 0.7	2	8,815	nw.	46	w.	3	10	11	7	....	4.5
St. Paul	837	171	179	29.28	30.23	+.14	16.6	+ 0.8	47	22	26	—17	10	7	33	14	10	77	0.22	— 0.7	2	7,857	nw.	44	nw.	3	6	17	5	5.9	2.2
La Crosse	714	71	87	29.44	30.25	+.17	19.1	— 1.0	50	22	28	—15	15	10	36	...	...	...	0.61	— 0.5	5	5,921	n.	30	n.	4	11	9	8	4.8	6.2
Madison	974	70	78	29.14	30.25	+.18	19.6	+ 1.0	46	22	28	— 8	5	11	35	18	14	79	0.97	— 0.6	4	8,248	nw.	54	ne.	13	10	8	10	4.8	8.5
Charles City	1,015	8	58	29.10	30.24	+.14	17.3	— 0.5	44	22	27	—22	15	7	35	16	14	89	1.45	+ 0.4	6	6,071	se.	31	nw.	3	10	10	8	4.8	9.3
Davenport	606	71	79	29.56	30.26	+.16	26.2	+ 0.9	55	22	34	0	5	18	32	23	19	76	2.21	+ 0.6	4	5,438	ne.	30	ne.	13	12	7	9	4.9	0.8
Des Moines	861	84	101	29.31	30.26	+.15	25.4	+ 2.3	61	22	35	—12	15	16	37	22	18	74	0.86	— 0.4	7	6,028	nw.	36	s.	22	9	10	9	5.3	7.1
Dubuque	698	100	117	29.49	30.28	+.19	22.4	— 0.2	53	22	32	—14	15	13	32	20	17	80	0.93	— 0.5	4	4,659	nw.	26	se.	3	14	8	6	4.1	7.7
Keokuk	614	63	78	29.57	30.28	+.17	29.2	+ 0.9	61	22	38	0	5	20	32	25	21	77	2.50	+ 0.8	6	5,292	nw.	30	nw.	24	15	4	9	4.2	3.5
Cairo	356	87	93	29.87	30.27	+.15	35.8	— 3.6	68	23	44	3	6	27	28	32	27	76	1.42	— 2.5	9	7,256	n.	38	n.	4	9	12	7	5.0	3.8
La Salle	536	56	64	29.67	30.28	+.20	26.6	.....	55	22	35	2	5	18	30	...	...	...	2.01	.....	4	5,631	n.	35	s.	3	12	8	8	5.0	T.
Peoria	609	11	45	29.57	30.26	+.16	27.0	.....	56	22	36	2	5	18	30	24	19	76	1.85	.....	4	6,514	s.	38	n.	13	14	7	7	4.6	0.1
Springfield, Ill.	644	10	92	29.53	30.25	+.15	29.1	— 1.2	64	20	38	0	7	20	30	26	21	75	2.18	— 1.2	6	6,476	s.	31	s.	3	10	9	9	5.0	5.5
Hannibal	534	75	109	29.66	30.26	+.15	30.0	— 0.5	66	22	40	2	5	20	35	...	...	...	2.08	+ 0.1	7	6,267	nw.	38	sw.	3	14	3	11	4.7	7.2
St. Louis	567	208	217	29.62	30.25	+.14	32.2	— 2.9	65	20	41	5	6	24	29	29	25	76	2.92	+ 0.1	7	7,509	se.	39	sw.	24	13	6	9	4.5	15.9
Missouri Valley.							**28.2**	**+ 3.7**										**72**	**1.09**	**— 0.1**									**4.7**	
Columbia, Mo	784	11	84	29.37	30.23	+.12	31.8	— 3.4	69	22	42	— 3	5	22	37	...	...	...	2.56	+ 0.2	7	5,916	s.	33	n.	13	15	3	10	4.4	4.4
Kansas City	963	78	95	29.18	30.26	+.15	33.8	+ 2.8	67	22	43	0	5	24	31	30	25	73	2.41	+ 0.6	8	5,853	se.	32	s.	22	14	5	9	4.1	2.0
Springfield, Mo	1,324	98	104	28.76	30.21	+.10	34.8	+ 0.1	70	22	45	— 3	5	24	42	30	25	71	1.99	— 1.0	9	7,725	s.	37	se.	23	18	6	9	4.6	5.0
Iola	984	40	47	29.16	30.25	+.15	35.8	.....	71	22	46	1	5	25	35	...	...	...	1.08	.....	5	6,216	sw.	30	sw.	28	11	8	9	5.1	0.6
Topeka	.....	85	89	.....	.....	.....	35.1	+ 3.8	73	22	46	2	5	24	38	...	...	...	1.03	— 0.6	10	6,690	s.	39	s.	28	12	11	5	4.3	1.7
Lincoln	1,189	11	84	28.89	30.21	+.11	30.5	+ 5.3	67	22	42	— 5	14	19	35	25	20	71	0.86	— 0.1	6	8,276	s.	46	n.	15	16	11	7	4.8	5.4
Omaha	1,105	115	121	29.00	30.23	+.12	28.4	+ 3.4	64	22	38	— 8	14	19	39	24	17	64	0.71	— 0.1	5	6,884	s.	45	ne.	13	6	12	10	5.9	6.8
Valentine	2,598	47	54	27.35	30.18	+.09	26.4	+ 4.9	69	21	39	— 8	14	14	45	22	17	72	0.33	— 0.4	6	6,799	nw.	36	n.	3	10	16	2	4.6	4.5
Sioux City	1,135	96	164	28.95	30.23	+.11	23.2	+ 4.2	61	22	34	—14	14	13	37	...	...	...	1.34	+ 0.8	7	9,198	s.	50	nw.	3	11	10	7	4.6	13.3
Pierre	1,572	43	50	28.48	30.22	+.11	23.8	+ 8.4	65	21	35	—20	10	13	42	19	13	71	0.10	— 0.3	2	5,005	se.	37	nw.	4	11	8	9	5.0	1.5
Huron	1,306	56	67	28.77	30.24	+.12	18.6	+ 6.6	56	19	31	—26	10	6	40	15	12	80	0.22	— 0.4	3	8,550	se.	40	nw.	3	14	12	2	3.5	3.5
Yankton	1,233	49	57	28.83	30.21	+.09	23.6	+ 4.4	63	22	35	—14	10	12	42	...	...	...	0.47	— 0.3	4	6,132	w.	36	nw.	3	10	6	12	5.7	5.9
Northern Slope.							**27.8**	**+ 6.7**										**71**	**0.42**	**— 0.1**									**4.9**	
Havre	2,505	11	44	27.36	30.10	+.03	24.2	+11.0	61	2	36	—19	14	12	44	21	17	78	0.11	— 0.4	4	5,759	w.	48	w.	19	11	13	4	4.6	1.1
Miles City	2,371	26	48	27.52	30.17	+.08	27.8	+11.6	64	21	39	—14	14	16	41	22	16	65	0.57	+ 0.1	7	3,710	s.	34	nw.	3	14	8	6	4.1	2.0
Helena	4,110	8	56	25.80	30.11	.00	29.8	+ 8.1	54	18	38	1	4	21	40	25	19	67	0.65	— 0.1	7	3,926	sw.	42	w.	19	9	8	11	5.8	10.6
Kalispell	2,962	8	34	26.94	30.09	+.01	28.2	.....	48	21	36	3	6	20	28	25	22	80	0.41	.....	10	2,759	nw.	26	w.	19	7	9	12	6.0	1.8
Rapid City	3,234	46	50	26.62	30.17	+.09	26.4	+ 5.8	67	21	39	— 8	14	14	38	23	18	76	0.32	— 0.3	7	4,628	w.	46	n.	3	12	8	8	4.9	2.4
Cheyenne	6,088	56	64	23.97	30.12	+.09	29.6	+ 2.3	60	21	43	— 9	4	16	40	23	14	56	0.21	— 0.2	3	7,655	nw.	49	nw.	25	13	6	9	4.4	2.1
Lander	5,372	26	36	24.62	30.14	+.06	25.8	+ 2.8	54	27	38	— 6	5	13	36	22	17	74	0.25	— 0.5	2	2,506	ne.	32	sw.	21	11	15	2	4.0	0.8
Yellowstone Park	6,200	11	48	23.83	30.14	+.04	23.8	.....	46	2	34	— 6	4	14	33	20	14	67	1.84	.....	12	5,195	s.	33	nw.	3	6	13	9	5.8	21.4
North Platte	2,821	11	51	27.15	30.18	+.11	30.7	+ 5.4	69	19	45	0	5	16	47	24	20	73	0.80	+ 0.4	5	5,471	se.	35	nw.	8	14	5	9	4.5	5.8
Middle Slope.							**30.3**	**+ 3.8**										**61**	**0.43**	**— 0.4**									**4.2**	
Denver	5,291	129	136	24.72	30.10	+.09	35.3	+ 3.1	69	21	49	0	5	21	45	26	14	49	0.06	— 0.5	2	5,572	s.	48	w.	19	13	10	5	3.9	1.1
Pueblo	4,685	80	86	25.29	30.09	+.09	34.3	+ 4.2	70	21	51	7	5	18	48	26	13	49	0.02	— 0.4	1	4,748	nw.	44	w.	25	17	11	0	2.8	0.4
Concordia	1,398	42	47	28.69	30.22	+.13	34.4	+ 6.2	69	22	46	0	5	23	39	28	24	75	0.50	— 0.4	6	5,610	s.	31	s.	28	11	11	6	4.4	1.2
Dodge	2,509	44	54	27.51	30.20	+.14	36.2	+ 4.4	75	28	50	— 1	5	23	41	30	24	71	0.87	+ 0.2	2	6,046	se.	35	s.	11	9	11	8	5.4	T.
Wichita	1,358	78	86	.....	30.22	+.14	36.9	+ 5.1	74	22	49	1	5	25	40	...	...	...	0.58	— 0.7	4	6,973	ne.	39	nw.	26	11	12	5	4.3	0.5
Oklahoma	1,214	79	86	28.86	30.18	+.11	40.4	— 0.1	75	22	53	5	5	28	41	33	25	62	0.56	— 0.4	3	11,282	s.	56	n.	4	15	7	6	4.1	T.
Southern Slope.							**42.6**	**+ 2.1**										**60**	**0.44**	**— 0.7**									**5.0**	
Abilene	1,738	45	54	28.34	30.18	+.13	47.3	+ 1.4	80	22	60	14	5	35	36	39	30	60	0.38	— 1.0	2	6,421	s.	39	n.	4	6	15	7	5.4	T.
Amarillo	3,676	10	49	26.32	30.13	+.11	38.4	+ 2.8	74	21	52	6	5	24	46	30	24	62	0.51	— 0.4	2	8,148	se.	45	n.	19	17	0	11	4.0	T.
Del Rio	944	8	57	29.14	30.14	+.14	53.3	.....	85	23	64	24	8	42	40	...	...	...	0.80	.....	5	5,439	se.	38	n.	4	8	10	10	5.6	
Roswell	3,578	9	57	26.39	30.08	+.10	43.4	.....	78	21	59	18	8	28	53	35	25	59	0.47	.....	3	4,380	s.	29	ne.	4	9	11	8	5.1	0.9
Southern Plateau.							**45.3**	**+ 3.7**										**61**	**0.89**	**— 0.1**									**4.5**	
El Paso	3,762	10	110	26.22	30.02	+.07	49.8	+ 0.4	76	21	61	29	8	38	38	40	30	55	1.37	+ 1.0	6	6,795	ne.	48	sw.	22	13	7	8	4.3	T.
Santa Fe	7,013	33	39	23.23	30.07	+.09	35.0	+ 3.0	56	27	45	12	5	25	31	28	20	60	0.55	— 0.2	7	4,731	ne.	38	sw.	28	15	8	5	3.8	7.3
Flagstaff	6,907	12	44	23.32	29.96	—.04	35.8	+ 5.2	58	27	46	19	24	26	34	31	27	75	0.82	— 2.5	10	4,064	sw.	36	sw.	28	7	5	16	6.5	6.7
Phoenix	1,108	50	56	28.83	30.00	+.04	58.2	+ 3.8	84	27	69	39	24	47	36	30	42	60	0.99	+ 0.3	5	2,894	e.	29	sw.	28	9	12	7	4.8	
Yuma	141	16	46	29.85	30.00	.00	62.2	+ 3.6	83	*	73	43	23	52	34	53	45	60	1.50	+ 1.0	4	3,293	s.	41	w.	28	19	7	2	2.4	
Independence	3,910	11	42	25.98	29.99	—.07	48.9	+ 6.1	72	27	59	31	23	38	30	41	31	55	0.13	— 0.4	5	3,944	se.	30	w.	21	7	17	4	5.4	
Middle Plateau.							**37.3**	**+ 5.4**										**69**	**0.84**	**— 0.2**									**5.7**	
Reno	4,532	56	63	25.44	30.02	—.06	41.0	+ 7.4	62	26	52	23	1	30	32	36	30	67	0.45	— 0.6	8	3,778	w.	42	s.	20	9	11	8	5.1	T.
Winnemucca	4,344	18	56	25.61	30.06	—.03	36.7	+ 4.2	63	20	47	18	5	26	33	32	28	75	0.94	0.0	9	5,746	ne.	52	sw.	20	9	3	16	6.0	2.0
Modena	5,479	10	43	24.61	30.04	.00	35.3	+ 6.0	60	27	46	18	4	25	32	31	26	74	0.47	— 1.1	7	5,759	w.	60	sw.	28	2	16	10	6.5	1.8
Salt Lake City	4,366	105	110	25.66	30.12	+.04	34.2	+ 1.3	56	27	40	22	4	28	26	31	26	74	1.96	+ 0.7	10	3,152	se.	47	n.	19	1	9	18	8.3	11.4
Durango	6,546	18	56	23.63	30.06	+.06	34.3	.....	57	27	47	16	5	22	34	27	20	63	0.24	.....	5	3,689	nw.	27	se.	28	11	11	6	4.4	2.0
Grand Junction	4,698	43	51	25.41	30.04	.00	39.3	+ 8.0	61	28	51	22	20	28	30	32	25	62	0.40	— 0.2	4	2,942	nw.	33	s.	28	14	10	4	3.8	3.9
Northern Plateau.							**34.9**	**+ 4.1**										**76**	**1.34**	**— 0.3**									**6.5**	
Baker City	3,471	82	58	26.47	30.14	+.02	28.9	+ 3.9	45	17	35	7	10	23	24	26	24	82	1.01	— 0.7	8	4,497	s.	26	s.	18	7	8	13	6.4	5.3
Boise	2,739	78	86	27.25	30.17	+.05	35.2	+ 0.6	57	20	42	17	7	29	20	32	27	74	1.48	— 0.1	10	4,182	se.	33	nw.	28	4	7	17	7.4	0.5
Lewiston	737	10	51	29.27	30.10	—.01	39.8	+ 1.3	58	21	47	21	8	32	21	...	...	...	0.70	— 0.5	10	3,215	e.	48	w.	18	5	10	13	6.5	T.
Pocatello	4,477	46	54	25.52	30.16	+.06	30.4	+ 7.4	51	27	37	6	5	24	25	27	22	74	1.35	— 0.5	7	6,631	se.	34	se.	20	11	10	7	4.5	4.9
Spokane	1,929	101	110	28.00	30.09	.00	35.0	+ 6.5	52	21	41	15	8	29	22	32	28	77	1.87	— 0.2	10	3,609	ne.	30	sw.	19	2	5	21	8.1	2.1
Walla Walla	1,000	71	79	29.01	30.10	—.01	40.2	+ 4.8	61	18	46	25	7	35	22	38	35	81	1.60	+ 0.2	8	4,186	s.	36	sw.	18	8	10	10	6.1	T.
N. Pac. Coast Reg.							**44.3**	**+ 3.7**										**82**	**5.04**	**— 0.6**									**6.3**	
North Head	211	11	86	29.70	29.93	—.13	47.2	+ 5.5	65	1	52	36	28	42	18	45	42	84	6.20	— 0.1	15	12,248	e.	66	se.	26	11	4	13	5.5	
Port Crescent	259	12	29	29.64	29.92	—.11	41.1	+ 3.3	54	2	47	29	28	35	20	...	...	...	2.81	— 1.9	13	3,832	e.	26	sw.	18	10	6	12	5.6	
Seattle	123	185	224	29.85	29.98	—.08	43.8	+ 2.4	59	17	50	30	5	38	22	41	39	86	4.60	+ 0.9	12	5,114	se.	42	s.	18	2	13	13	7.1	
Tacoma	213	113	120	29.74	29.97	—.09	42.7	+ 3.8	59	17	49	27	13	36	25	...	...	...	3.95	— 1.4	13	3,115	sw.	31	sw.	24	0	12	16	7.6	
Tatoosh Island	86	7	57	29.80	29.99	—.10	45.4	+ 4.6	54	4	49	39	*	42	11	48	39	80	5.86	— 2.6	15	16,218	e.	70	sw.	18	8	2	18	7.1	
Portland, Oreg	153	68	96	29.82	29.98	—.10	45.0	+ 3.8	59	17	50	31	3	40	20	41	36	74	6.76	+ 0.6	15	4,887	e.	31	e.	5	9	5	14	6.1	
Roseburg	510	9	57	29.42	29.98	—.12	44.9	+ 2.8	63	17	51	34	5	38	23	43	41	86	5.08	+ 0.2	16	1,908	s.	24	sw.	24	10	8	10	5.3	

TABLE I.—*Climatological data for U. S. Weather Bureau stations, February, 1906*—Continued.

Stations.	Elevation of instruments. Barometer above sea level, feet.	Thermometers above ground.	Anemometer above ground.	Pressure, in inches. Actual, reduced to mean of 24 hours.	Sea level, reduced to mean of 24 hrs.	Departure from normal.	Temperature of the air, in degrees Fahrenheit. Mean max. + mean min. ÷ 2.	Departure from normal.	Maximum.	Date.	Mean maximum.	Minimum.	Date.	Mean minimum.	Greatest daily range.	Mean wet thermometer.	Mean temperature of the dew-point.	Mean relative humidity, per cent.	Precipitation, in inches. Total.	Departure from normal.	Days with .01, or more.	Wind. Total movement, miles.	Prevailing direction.	Maximum velocity. Miles per hour.	Direction.	Date.	Clear days.	Partly cloudy days.	Cloudy days.	Average cloudiness during daylight, tenths.	Total snowfall.
Mid. Pac. Coast Reg.							**53.5**	**+ 4.2**										**80**	**4.43**	**+ 0.3**										**7.0**	
Eureka	62	62	80	29.94	30.01	— .10	51.4	+ 5.0	68	17	57	38	28	46	21	48	46	81	6.27	— 0.2	17	4,631	se.	36	s.	14	3	9	16	6.9	
Mount Tamalpais	2,375	11	18	27.56	30.04	— .06	48.3	.....	66	3	52	35	28	44	17	45	42	83	5.94	.....	15	11,378	se.	49	nw.	28	5	4	19	7.5	
Point Reyes Light	490	7	18	.....	.....	.....	54.2	+ 4.9	74	3	58	44	28	50	18	...	...	...	3.33	— 0.5	15	12,088	s.	70	s.	14	3	8	17	7.1	
Red Bluff	332	50	56	29.67	30.03	— .08	52.8	+ 3.8	76	1	61	40	28	45	31	48	44	78	5.47	+ 1.8	13	3,577	s.	26	s.	20	9	1	18	7.0	
Sacramento	69	106	117	29.97	30.04	— .05	53.8	+ 4.0	68	1	60	40	28	47	24	50	47	80	3.02	— 0.1	14	5,204	se.	37	se.	14	9	3	16	6.4	
San Francisco	155	161	167	29.90	30.07	— .03	55.2	+ 3.5	71	3	60	46	28	50	19	51	48	79	4.30	+ 0.6	12	4,439	w.	29	w.	28	3	7	18	7.4	
San Jose	141	78	88	29.90	30.05	.....	54.8	.....	73	1	63	38	1	47	**35**	.....	.....	.....	2.31	.....	13	3,532	se.	31	se.	14	4	12	12	6.7	
Southeast Farallon	30	9	17	30.01	30.04	.....	54.8	.....	68	1	58	46	28	52	15	.....	.....	.....	2.87	.....	16	8,275	s.	56	s.	14	5	7	16	7.0	
S. Pac. Coast Reg.							**57.0**	**+ 3.5**										**77**	**2.69**	**+ 0.1**										**6.0**	
Fresno	330	67	70	29.70	30.06	— .02	55.2	+ 5.0	69	3	64	37	1	47	30	50	46	74	2.20	+ 1.0	15	3,001	nw.	24	n.	28	6	8	14	6.5	
Los Angeles	338	116	123	29.67	30.04	— .02	58.4	+ 4.0	82	1	66	46	23	51	30	52	48	76	2.47	— 0.8	10	3,277	w.	36	sw.	28	6	5	17	6.4	
San Diego	87	94	102	29.93	30.01	— .05	58.0	+ 3.2	76	2	63	47	23	53	22	54	51	81	2.62	+ 0.4	11	3,849	nw.	30	w.	28	10	9	9	5.7	
San Luis Obispo	201	47	54	29.85	30.06	— .05	56.2	+ 1.9	83	1	65	39	28	48	35	51	47	76	3.48	— 0.3	13	2,965	n.	24	n.	26	6	13	9	5.6	
West Indies.																															
Grand Turk	11	6	20	30.03	30.04	— .02	76.1	.....	86	12	83	62	1	69	.....	.....	.....	.....	0.60	.....	6	.....	e.	.....	.....	.....	.....	.....	.....	.....	.....
San Juan	82	48	90	29.94	30.03	— .02	75.2	.00	88	28	81	65	26	70	17	69	66	76	1.33	— 1.0	11	5,976	e.	29	e.	12	17	9	2	3.2	

* More than one date.

TABLE II.—*Climatological record of cooperative observers, February, 1906.*

Stations.	Temperature. (Fahrenheit.) Maximum.	Minimum.	Mean.	Precipitation. Rain and melted snow.	Total depth of snow.
Alabama.	°	°	°	*Ins.*	*Ins.*
Alaga	.....	.....	.....	2.76	
Ashville	68	19	43.0	1.55	T.
Benton	.....	.....	.....	3.83	
Bermuda	73	26	46.8	3.98	
Boligee	73	25	46.3	2.52	T.
Bridgeport	.....	.....	.....	1.56	
Burkeville	.....	.....	.....	3.10	
Calera	.....	.....	.....	1.49	0.2
Camp Hill	71[4]	23[3]	45.5[4]	1.92	
Cedar Bluff	.....	.....	.....	1.19	
Citronelle	71	27[3]	51.4[3]	2.55	
Clanton	70	22	45.4	2.85	
Dadeville	.....	.....	.....	2.76	
Daphne	72	30	51.4	4.42	
Decatur	73	19	45.3	1.15	
Demopolis	.....	.....	.....	2.46	
Eufaula	70	26	46.2	2.61	
Evergreen	71	28	47.6	2.73	
Flomaton	72	25	49.6	1.90	
Florence	71	14	42.2	1.38	
Fort Deposit	71	24	46.4	3.83	
Gadsden	73	22	44.8	1.54	
Goodwater	73	23	46.8	2.70	T.
Greensboro	72	25	45.2	2.43	
Greenville	.....	.....	.....	3.10	
Guntersville	.....	.....	.....	2.10	
Hamilton	71	17	42.8	2.17	
Highland Home	73	26	50.0	3.46	
Letohatchie	.....	.....	.....	3.33	
Livingston	72	23	43.4	2.36	
Lock No. 4	70	21	45.2	1.51	0.5
Lucy	75	27	51.6	3.92	
Madison Station	72	17	43.8	1.44	
Maplegrove	73	21	42.4	1.47	
Marion	71	26	45.3	2.10	T.
Milstead	.....	.....	.....	2.42	
Newbern	73	23	45.6	2.59	
Oneonta	70	11	42.4	2.09	T.
Opelika	72	23	47.2	1.84	
Ozark	.....	.....	.....	3.01	
Prattville	73	25	47.2	3.18	
Riverton	73	12	40.6	1.55	0.1
Scottsboro	71	17	43.0	2.24	T.
Selma	75	25	46.4	2.72	
Springhill	68	31	50.6	2.55	
Talladega	71	22	44.8	1.36	1.0
Tallassee	.....	.....	.....	2.98	
Tuscaloosa	70	24	43.5	2.79	
Tuscumbia	68	15	41.2	1.40	
Tuskegee	73	25	48.6	1.91	
Union Springs	71	24	47.4	3.78	
Uniontown	73	24	46.9	2.60	
Valleyhead	71	15	42.4	2.00	1.0
Vienna	.....	.....	.....	2.44	
Wetumpka	72	24	49.1	3.54	
Alaska.					
Juneau	45	19	35.2	1.57	.....
Killisnoo	45	16	31.8	2.70	1.5

Stations.	Temperature. (Fahrenheit.) Maximum.	Minimum.	Mean.	Precipitation. Rain and melted snow.	Total depth of snow.
***Alaska*—Cont'd.**	°	°	°	*Ins.*	*Ins.*
Loring	52	16	33.8	6.08	
Orca	47	16	30.2	0.94	.....
Sitka	50	22	37.2	1.89	
Skagway	40	10	27.9	1.16	.....
Arizona.					
Allaire Ranch	.....	.....	.....	1.63	
Alpine	.....	.....	.....	1.33	12.6
Arizona Canal Co. Dam	86	37	59.4	0.81	
Aztec	89	35	61.0	1.50	
Benson	78	31	51.6	1.59	
Bisbee	66	30	46.0	2.31	5.0
Blue	89	20	45.7	0.66	
Bowie	69	33	52.5	1.13	T.
Buckeye	84	34	57.0	1.08	
Casagrande	86	34	57.4	0.88	
Clifton	.....	.....	.....	2.21	T.
Cline	86	32	53.4	1.09	
Cochise*[1]	71	34	45.2	1.80	
Congress	75	41	54.3	1.79	
Douglas	79	29	52.7	1.07	
Dudleyville	82	30	53.6	1.37	
Duncan	77	22	47.0	1.59	1.0
Flagstaff	.....	.....	.....	1.25	9.5
Fort Apache	72	22	44.5	0.73	
Fort Huachuca	72	31	47.8	2.42	
Fort Mohave	84	38	59.5	0.80	
Gilabend	84	41	59.6	1.10	
Globe	73	30	49.8	0.83	
Greaterville	70	29	46.4	1.58	5.5
Greer	.....	.....	.....	0.86	3.0
Holbrook	67	22	42.2	0.23	
Huachuca Res	.....	.....	.....	4.40	16.3
Jerome	69	33	47.6	1.90	
Keams Canyon	64	20	39.2	1.01	1.0
Kingman	74	28	50.4	1.07	
Maricopa	89	34	58.0	0.94	
Mesa	88	33	56.5	0.83	
Mohawk Summit*[1]	85	51	63.2	0.75	
Natural Bridge	.....	.....	.....	1.10	
Nutrioso	.....	.....	.....	2.59	2.0
Oracle	70	35	48.8	3.03	
Paradise	81	25	46.7	1.81	0.5
Phoenix	85	33	56.9	0.16	
Picacho*[1]	82	47	57.5	0.90	
Pinal Ranch	.....	.....	.....	2.55	2.0
Pinto	.....	.....	.....	0.08	T.
Prescott	60	18	38.7	0.13	T.
Roosevelt	78	36	56.8	1.34	
St. Michaels	59	14	35.2	1.13	1.2
San Carlos	80	30	52.2	0.79	
San Simon	76	28	50.0	1.09	
Seligman	69	21	42.6	0.60	T.
Sentinel*[1]	83	40	58.6	1.47	
Show Low	.....	.....	.....	0.75	1.6
Signal	81	34	56.2	0.83	
Taylor	67	18	40.6	0.63	0.8
Tempe	85	31	56.4	0.92	
Thatcher	81	25	51.2	1.14	

Stations.	Temperature. (Fahrenheit.) Maximum.	Minimum.	Mean.	Precipitation. Rain and melted snow.	Total depth of snow.
***Arizona*—Cont'd.**	°	°	°	*Ins.*	*Ins.*
Tombstone	70	34	48.7	1.68	
Tuba	63	23	43.4	0.34	1.2
Tucson	88	31	55.2	0.33	
Vail*[5]	78	52	66.0	2.25	
Walnut Grove	.....	.....	.....	1.90	
Willcox	74	24	57.4	1.25	
Yarnell	.....	.....	.....	2.95	
Young	70	21	45.8	2.88	
Arkansas.					
Alicia	68	.....	.....	1.65	T
Amity	73	14	43.6	3.18	0.2
Arkadelphia	73	16	44.4	2.52	0.5
Arkansas City	.....	.....	.....	0.87	
Arnett	.....	.....	.....	2.12	3.5
Batesville	68	8	40.8	2.76	4.0
Beebranch	67	5	40.4	2.60	1.0
Blackrock	.....	.....	.....	2.59	0.3
Brinkley	72	14	42.4	1.87	
Calico Rock	.....	.....	.....	2.38	3.5
Camden	71	19	46.2	1.55	
Center Point	75	16	46.1	3.90	
Clarendon	.....	.....	.....	1.43	1.0
Conway	72	10	43.0	2.63	1.5
Cornerstone	75	20	42.8	1.00	T.
Corning	67	4	38.8	1.85	3.7
Dardanelle	.....	.....	.....	1.34	2.6
Des Arc	72	15	42.3	2.53	0.5
Dodd City	68	— 7	38.0	2.50	4.0
Dutton	67	1	38.4	3.21	4.6
Eldorado	73	17	44.9	1.37	T.
Eureka Springs	71	— 4	38.4	2.24	3.0
Fayetteville	69	— 2	38.2	1.87	1.6
Forrest City	72	12	42.2	1.87	T.
Fulton	.....	.....	.....	2.12	
Hardy	68	2	38.4	2.96	6.5
Harrison	68	— 5	37.0	2.13	2.5
Heber	70	4	40.3	2.24	7.0
Helena	73	13	43.6	1.30	0.5
Hope	75	18	47.0	2.15	0.1
Huntsville	70	— 6	39.2	2.40	4.0
Jonesboro	72	6	41.0	2.30	3.3
Junction	75	11	45.4	1.43	.....
Lacrosse	66	— 4	37.8	1.98	3.2
Lake Village	75	16	44.0	1.80	
Lewisville	74	18	46.4	1.58	
Lonoke	71	12	41.7	2.25	
Lutherville	69	4	40.2	2.99	3.0
Luxora	.....	.....	.....	4.00	
Malvern	72	14	42.2	2.65	0.5
Marked Tree	.....	.....	.....	3.85	
Marvell	72	17	43.3	2.30	0.2
Mena	69	11	43.4	3.68	0.3
Mossville	60	0	36.6	3.19	3.6
Mountain Home	66	3	39.4	2.65	5.0
Mount Nebo	.....	.....	.....	2.00	3.0
Newport	74	11	41.8	2.06	2.0
Oregon	.....	.....	.....	2.13	2.5
Osceola	70	11	41.4	2.00	

TABLE II.—*Climatological record of cooperative observers*—Continued.

Stations.	Temperature. (Fahrenheit.) Maximum.	Minimum.	Mean.	Precipitation. Rain and melted snow.	Total depth of snow.
Arkansas—Cont'd.	°	°	°	*Ins.*	*Ins.*
Ozark	70	8	41.6	1.81	2.5
Perry	66	13	41.5	3.10	2.5
Pinebluff	72	17	42.1	1.73	1.0
Pocahontas				3.15	0.9
Pond	71			1.60	3.0
Prescott	75	16	44.6	2.29	0.5
Princeton	73	11	44.5	1.89	0.5
Rison	75[c]	16[c]	44.2[d]	1.14	
Rogers	62	— 2	38.6	1.89	3.0
Russellville	68	11	38.8	3.48	1.0
Spielerville	72	6	41.8	2.45	2.0
Stuttgart	71	13	43.0	1.49	0.5
Tate	73	5	41.5	3.10	3.0
Texarkana	66[i]	18	43.7[c]	2.23	
Warren				1.42	
White Cliffs				2.56	
Wiggs	75	10	42.3	3.27	2.0
Winchester	74	20	43.8	1.05	
Witts Springs	56[f]	1	34.0[d]		2.0
California.					
Alturas	56	19	37.2	1.08	
Auburn	63	41	52.4	7.79	
Azusa	82	37	56.0	1.99	
Bagdad	77	45	60.6	0.90	
Bakersfield	77	29	53.6	0.70	
Barstow	84	37	59.8	T.	
Bear Valley				13.64	43.0
Berkeley	68	36	54.8	3.96	
Bishop	73	24	46.4	0.14	
Blocksburg	68	30	47.3	13.18	
Blue Canyon	68	28	41.0	11.24	39.0
Bodie	54	— 3	27.0	1.30	16.0
Bowman				11.99	65.0
Branscomb	76	29	47.2	16.25	
Brush Creek	66	32	46.1	13.46	T.
Butte Valley				8.45	13.5
Calexico	81	46	61.4	1.35	
Campbell	69	35	53.8	2.47	
Campo				3.69	
Cedarville	56	19	35.6	1.77	6.0
Chico	76	37	54.1	4.57	
Claremont	80	31	55.9	2.19	
Cloverdale	75	36	53.5	7.21	
Colfax	88	30	51.4	8.98	T.
Colusa	73	29	49.2	3.63	
Craftonville				3.36	2.0
Crescent City	67	34	49.3	10.97	
Crockers				9.61	13.0
Cuyamaca	57	19	38.2	7.40	2.0
Delta	75	33	50.4	11.67	1.0
Dobbins	78	40	54.2	8.90	
Donner				5.27	52.0
Drytown				5.15	
Durham	77	32	53.2	5.10	
Elcajon	81	38	56.9	2.13	
Electra	72	39	56.1	6.36	
Elmwood	70	35	53.4	0.99	
Elsinore	76	34	55.4	1.04	
Emigrant Gap	52	28	39.6	11.35	53.0
Escondido	79	35	57.0	2.14	
Folsom	70	38	54.4	5.85	
Fordyce				15.34	96.5
Fort Bragg				4.81	
Fort Ross	71	39	52.5	12.69	
Fruitvale				4.36	
Georgetown	75	31	48.2	13.22	T.
Gilroy (near)	75	34	54.6	3.25	
Glendora				2.75	
Gold Run	82	25	48.6	11.76	3.0
Grass Valley				9.22	
Greenville	64	21	41.6	7.17	10.5
Hanford	94	30	53.1	1.92	
Healdsburg	75	35	54.3	7.83	
Heber	86	43	62.8	0.98	
Hollister	73	34	53.9	3.20	
Indio	88	42	63.1	0.97	
Idylwild	67	21	43.0	5.32	1.7
Imperial	88	38	62.4	2.50	
Iowa Hill	77	32	48.6	10.01	2.1
Irvine				1.62	
Isabella				1.65	
Jamestown	74	34	52.9	7.11	
Jolon				3.16	
Kennedy Gold Mine				5.04	
Kentfield				11.14	
Kernville				1.28	
King City	85	39	57.4	2.95	
Laporte	64	23	38.8	15.97	66.1
Laytonville				10.96	
Le Grand	76	36	50.7	2.40	
Lemoncove	76	37	56.1	2.33	
Lick Observatory	64	26	43.6	5.76	0.5
Livermore	74	35	54.4	2.67	
Lodi	70	36	53.7	3.30	
Lone Pine	71	27	48.4	0.11	
Los Gatos	70	40	53.6	4.75	
Lowe Observatory				3.80	
Magalia	74	29	51.1	12.58	
Mammoth	85	42	62.9	1.40	
Marysville	72	37	54.2	4.81	
Merced	74	31	54.9	2.92	
Mercury				8.98	
Mills College				4.74	
Milo				3.24	
Milton (near)	66	39	54.0	5.19	
Mohave	70	40	52.2	1.00	T.
Mokelumne Hill	68	36	52.0	6.17	
Mono Ranch	70	29	47.6	3.94	T.
Montague	60	23	41.8	1.12	
Monterio	70	34	49.2	2.00	
Monumental	66	24	42.6	22.27	9.0
Mount St. Helena				10.77	
Napa	72	36	54.4	4.28	
Needles	80	51	64.2	0.90	
Nellie				8.70	1.0
Nevada City	86	30	46.6	8.87	0.5
Newcastle	69	35	53.2	6.23	
Newman	70	33	55.3	1.74	
Niles	70	40	54.7	4.48	
Nimshew	79	32	48.0	11.82	0.2
North Bloomfield	69	30	43.8	9.95	1.0
Oakland	68	44	55.0	3.95	
Orleans	73	30	52.2	9.65	
Oroville (near)	69	37	53.9	5.76	
Ozena				1.69	
Palermo	71	34	53.1	5.21	
Peachland	75	36	53.0	8.36	
Pilot Creek				13.92	30.0
Pine Crest	79	42	56.8	4.50	
Placerville	66	32	49.3	7.99	
Point Lobos	67	45	58.2	3.66	
Porterville	75	40	56.4	1.35	
Poway	78	42	57.8	2.88	
Priest Valley				3.40	
Quincy	54	24	38.6	8.08	6.0
Redding	76	39	52.4	7.58	
Redlands	81	38	56.0	3.04	
Reedley	72	38	56.0	2.28	
Represa				6.40	
Riovista	69	37	54.3		
Riverside	85	33	56.1	1.44	
Rocklin	70	36	53.7	5.52	
Sacramento	68	38	54.0	3.46	
Salinas	76	40	56.0	3.43	
Salton	78	28	56.2	0.00	
San Bernardino	83	35	57.0	2.89	T.
San Jacinto	77	36	54.2	1.99	
San Leandro	70	38	53.8	4.22	
San Miguel Island				3.88	
Santa Barbara	82	42	58.4	3.67	
Santa Clara College	75	34	55.6	2.71	
Santa Cruz	78	36	54.6	7.70	
Santa Maria	78	39	56.8	3.40	
Santa Monica	81	42	56.0	2.70	
Santa Rosa	73	33	52.6	5.24	
Sausalito				7.10	
Shasta	80	35	52.8	11.27	
Sierra Madre	79	42	56.8	3.19	
Sisson	59	24	39.7	4.81	4.0
Skyland				10.02	
Snedden				1.75	2.0
Sonoma	72	35	54.4	5.10	
Sonora				6.16	
Sterling	66	32	45.6	17.32	9.5
Stockton	62	36	51.1	2.85	
Storey	68	33	53.2	2.21	
Summerdale	67	23	41.8	8.20	25.0
Summit	52	24	37.2	9.30	82.0
Susanville	56	18	37.8	2.14	6.0
Tamarack	55	—11	28.8	9.00	90.0
Tejon	78	40	54.2	2.66	
Towle	70	29	44.6	10.91	4.0
Truckee	54	26	32.6	3.80	35.0
Tulare	76	34	56.1	1.13	
Tustin	78	47	59.8	1.71	
Ukiah	73	31	51.2	7.05	
Upland	72	31	53.5	3.00	
Upperlake	76	34	51.2	6.20	
Upper Mattole				12.85	
Vacaville	74	31	54.0	4.86	
Visalia	71[i]	29	52.4[c]	1.48	
Wasco	78	32	55.6	1.92	
Wasioja				2.97	
Weldon				0.95	
Westpoint				8.17	
West Saticoy				3.89	
Wheatland	66	36	52.4	4.37	
Willits	82	28	50.8	11.59	
Woodleaf				13.83	
Woodside	66	36	53.4	5.36	
Yreka				2.67	1.0
Zenia	74	28	46.1	12.37	T.
Colorado.					
Akron				0.26	3.0
Alford	61	— 6	29.6	0.07	1.2
Antelope Springs	47	—20	12.7	0.45	4.6
Ashcroft	47	— 6	19.2	1.28	21.0
Blaine	74	4	37.2	0.37	
Boulder	68	2	37.6	0.17	2.5
Breckenridge	49	— 7	20.4	0.33	6.0
Buenavista	58	4	29.7	T.	0.2
Burlington	70	0	33.2	0.36	0.6
Canon City	69	5	39.7	T.	T.
Cardinal	51	— 7	23.5	0.90	10.0
Castlerock	68	— 5	31.3	0.10	1.5
Cheesman	62	1	31.6	0.04	0.5
Cheyenne Wells	70	2	34.9	0.25	1.5
Clearview	52	5	28.4	0.27	4.5
Collbran	55	10	32.0	0.54	6.5
Colorado Springs	65	1	31.7	0.07	0.7
Cripplecreek				0.09	0.8
Delta	66	10	36.4	0.13	1.3
Dunkley	47	— 4	21.7	1.41	28.0
Eagle	56	— 3	26.7	0.21	3.0
Fort Collins	67	— 5	30.6	0.03	0.2
Fort Morgan	68	— 4	32.3	0.03	0.5
Fowler				0.34	1.5
Frances	52	— 3	27.4	0.34	5.5
Fruita	61	20	38.0	0.16	2.0
Garnett	55	1	27.0	0.05	0.5
Gleneyre	70	— 4	32.2	0.01	0.1
Glenwood Springs	58	9	31.0	0.96	7.0
Grand Valley	65	18	37.2	0.56	7.5
Greeley	68	— 5	32.4	0.01	0.2
Gunnison	35	—29	6.6	0.60	7.2
Hahns Peak	42	—15	14.6	1.63	26.0
Hamps	66	— 5	30.6	0.90	11.0
Hoehne	74	— 5	33.2	0.50	0.5
Holly	80	2	40.2	T.	
Idaho Springs	62	— 2	31.6	T.	T.
Lake City	45	— 8	20.0	0.31	7.0
Lake Moraine	48	0	25.9	0.06	1.2
Lamar	82	6	40.2	0.08	T.
Laporte				0.05	0.9
Las Animas	80	1	35.8	0.20	
Lay	51	—13	21.1	1.42	17.5
Leroy	65	— 5	32.7	0.43	6.5
Longs Peak	50	— 6	23.3	0.10	2.0
Mancos	57	—12	34.2	0.72	5.0
Meeker	55	— 4	27.4	0.66	9.5
Montrose	70	11	34.2	0.42	5.0
Moraine	51	0	27.8	0.25	4.0
Pagoda	49	— 3	26.9	0.52	6.0
Paonia	63	17	36.8	0.42	4.5
Platte Canon				0.10	1.0
Rockyford	78	0	37.6	0.10	T.
Saguache	53	4	28.4	T.	T.
Salida	58	5	31.4	T.	T.
San Louis	57	5	30.0	0.12	2.0
Santa Clara	63	2	30.4	0.22	6.0
Sapinero	45	—12	16.7	0.76	9.9
Sheridan Lake	77	0	35.1	0.06	0.2
Silt	57	11	33.7	0.16	2.0
Silverton	46	— 8	20.8	0.80	9.5
Stonewall				0.05	1.5
Sugar City				0.08	T.
Trinidad	70	8	37.2	0.55	6.0
Victor	62	8	32.8	T.	T.
Vilas				0.31	T.
Wagon Wheel	49	—21	15.0	0.37	6.0
Waterdale	62	— 2	32.5	0.04	1.0
Westcliffe	55	— 3	28.2	0.01	0.1
Whitepine	42	— 9	16.6	0.86	14.0
Wray	75	3	36.4	0.62	3.0
Yuma				0.51	3.5
Connecticut.					
Bridgeport	51	2	30.0	3.08	7.0
Canton	50	— 3	25.1	1.97	9.5
Colchester	56	— 2	28.4	2.47	3.5
Falls Village				2.71	9.8
Hawleyville	52	— 2	27.5	1.94	11.0
Lake Konomoc				3.01	
New London	52	2	30.5	3.28	3.0
North Grosvenor Dale	58	— 1	25.6	2.54	
Norwalk	53	— 1	27.6	2.12	5.0
Southington	53	— 1	27.6	1.90	6.0
South Manchester				2.06	9.0
Storrs	54	— 2	28.4	2.68	T.
Voluntown	53	— 1	28.8	3.02	3.0
Wallingford				3.15	
Waterbury	57	— 3	28.8	2.29	10.0
West Cornwall	46	—11	25.6	2.55	12.9
West Simsbury				1.81	11.0
Delaware.					
Delaware City				2.31	
Milford	65	9	35.7	4.44	5.0
Millsboro	68	7	35.6	4.42	4.0
Newark	59	5	32.4	2.75	3.7
Seaford	60	9	34.8	4.61	5.0
District of Columbia.					
West Washington	66	6	34.2	2.13	6.9
Florida.					
Archer	83	32	57.4	2.41	
Avon Park	82	41	62.7	3.14	

TABLE II.—*Climatological record of cooperative observers*—Continued.

Stations.	Temperature. (Fahrenheit.) Maximum.	Minimum.	Mean.	Precipitation. Rain and melted snow.	Total depth of snow.
Florida—Cont'd.	°	°	°	*Ins.*	*Ins.*
Bartow	79	40	62.4	2.41	
Bonifay	73	30	51.6	2.89	
Brooksville	83	35	60.6	1.52	
Caxambus	84	41	66.5	3.64	
Clermont	84	40	62.6	0.85	
De Funiak	74	26	50.4	3.34	
Deland	81	35	61.4	.....	
Eustis	79	35	59.2	0.76	
Federal Point	78	39	57.3	3.51	
Fernandino	77	34	54.2	4.61	
Flamingo	85	45	70.0	.....	
Fort Meade	81	38	61.8	3.17	
Fort Myers	79	44	63.9	2.18	
Fort Pierce	80	43	63.8	2.85	
Gainesville	80	34	56.7	1.73	
Grasmere	77	38	60.0	.....	
Huntington	78	35	58.0	3.11	
Hypoluxo	81	45	66.2	4.67	
Inverness	80	37	58.8	0.81	
Jasper	.....	.....	.....	2.76	
Johnstown	78e	28e	54.4e	2.77	
Kissimmee	77	38	59.9	1.49	
Lake City	80	31	55.1	3.45	
Macclenny	80	31	53.8	3.32	
Madison	.....	.....	.....	2.88	
Malabar	83	40	61.6	3.18	
Manatee	81	41	62.7	2.96	
Marianna	78	30	53.8	4.65	
Merritt Island	79	42	61.8	2.22	
Miami	81	48	68.2	3.78	
Middleburg	79	26	54.1	3.77	
Molino	74	23	48.9	5.05	
Monticello	73	30	53.4	2.99	
New Smyrna	84	36	61.6	4.02	
Nocatee	81	41	63.6	2.60	
Ocala	82	33	59.2	1.65	
Orange City	84	33	60.0	1.05	
Orange Home	81	34	59.8	1.05	
Orlando	80	37	60.3	0.84	
Plant City	83	35	62.0	1.93	
St. Andrews	73	32	52.8	3.42	
St. Augustine	78	34	56.0	3.20	
St. Leo	81	35	60.4	1.64	
Sumner	79	30	56.8	2.19	
Switzerland	78	35	55.4	2.82	
Tallahassee	74	31	52.3	2.05	
Tarpon Springs	81	35	59.3	2.03	
Titusville	82e	36e	60.9e	2.28	
Wausau	76	30	52.7	3.84	
Georgia.					
Abbeville	.....	.....	.....	3.13	
Adairsville	68	19	43.2	0.90	
Albany	76	28	50.2	2.80	
Allapaha	76	29	50.9	4.14	
Americus	72	27	47.2	3.32	
Athens	64	20	42.8	1.26	1.9
Bainbridge	77	27	51.0	3.53	
Blakely	74	27	51.0	3.95	
Bowersville	68	19	43.2	1.43	2.0
Butler	.....	.....	.....	3.32	
Camak	74	22	42.4	2.44	T.
Canton	.....	.....	.....	0.71	
Carlton	.....	.....	.....	1.42	
Carrollton	72	21	42.8	1.10	1.0
Clayton	67	12	41.6	1.65	T.
Columbus	74	28	48.4	1.51	
Cordele	74	24	48.1	2.70	
Covington	.....	.....	.....	1.33	
Cuthbert	71	27	50.0	1.92	
Dahlonega	71	14	43.3	0.60	T.
Dawson	75	27	50.0	3.27	
Diamond	75	12	43.9	.....	
Dublin	.....	.....	.....	2.02	
Eastman	74	26	48.5	2.67	
Eatonton	71	23	46.8	2.36	
Elberton	70	22	45.4	1.60	2.0
Experiment	70	22	45.6	1.30	
Fitzgerald	75	26	50.4	3.75	
Fleming	82	27	52.8	2.65	
Forsyth	74	23	47.8	1.74	
Fort Gaines	.....	27	45.0e	3.42	
Gainesville	64	19	41.7	0.21	
Gillsville	72	19	44.8	0.71	1.5
Glenville	73	29	48.4	4.27	
Greenbush	68	16	41.6	0.93	T.
Greensboro	72	22	44.2	2.61	T.
Griffin	72	21	46.4	1.37	
Hawkinsville	78	25	44.5	1.96	
Lost Mountain	70	16	43.4	0.64	2.0
Louisville	76	26	49.1	2.67	
Lumpkin	74	23	48.6	2.61	
Marshallville	71	26	48.4	2.45	
Mauzy	75	28	51.7	3.73	
Milledgeville	73	24	46.2	2.35	
Millen	75e	26e	47.7e	2.28	
Montezuma	.....	.....	.....	2.30	
Monticello	71	23	46.0	2.09	
Morgan	72	27	48.9	3.47	

Stations.	Temperature. (Fahrenheit.) Maximum.	Minimum.	Mean.	Precipitation. Rain and melted snow.	Total depth of snow.
Georgia—Cont'd.	°	°	°	*Ins.*	*Ins.*
Newnan	73	19	45.0	1.04	
Oakdale	.....	.....	.....	0.62	0.5
Oxford	.....	.....	.....	1.24	T.
Point Peter	70	18	44.2	2.02	2.5
Poulan	75	26	49.1	4.02	
Putnam	75	25	47.8	2.59	
Quitman	76	30	51.4	3.48	
Ramsey	68	14	44.6	0.89	T.
Resaca	.....	.....	.....	0.74	
Rome	72	20	43.2	0.74	
St. George	78	31	53.9	2.16	
St. Marys	76	30	52.8	3.66	
Screven	75	33	54.4	4.23	
Talbotton	71	24	47.0	2.38	
Tallapoosa	71	20	43.4	1.99	0.5
Toccoa	69	18	42.8	1.18	0.9
Valdosta	75	30	52.4	3.90	
Valona	74	32	51.0	3.70	
Vidalia	71	26	48.4	3.06	
Washington	69	22	43.5	2.49	T.
Waycross	77	30	51.8	4.02	
Waynesboro	72	24	47.2	0.86	
Westpoint	71	23	45.6	1.41	
Woodbury	69	20	44.0	1.62	
Idaho.					
American Falls	49	3	29.7	1.52	.....
Blackfoot	47	2	27.8	0.42	4.0
Caldwell	55	16	34.9	2.77	2.0
Cambridge	50	−13	26.9	3.28	.....
Chesterfield	46	−18	21.6	0.46	6.0
Dent	48	18	36.2	2.45	2.5
Dewey	53	6	27.2	1.65	16.0
Ellerslie	51	13	31.6	1.40	.....
Fernwood	.....	.....	.....	0.88	3.0
Forney	56	− 5	26.7	1.99	20.0
Franklin	.....	.....	.....	2.36	3.5
Garnett	60	18	37.5	1.32	.....
Grangeville	53	18	35.2	1.97	12.0
Hope	.....	.....	.....	3.47	3.0
Hot Springs	56	11	35.6	1.04	.....
Idaho Falls	44	− 1	27.9	1.05	8.0
Kellogg	51	12	34.5	2.92	2.8
Lake	32	− 6	14.9	2.40	24.0
Lakeview	50	17	33.9	2.90	1.0
Landore	50	1	27.0	5.67	34.4
Lardo	.....	.....	.....	3.48	.....
Lost River	45	−11	19.4	1.01	13.0
Meadows	48	− 8	25.8	2.34	12.0
Milner	54	6	29.3	1.80	5.5
Minidoka	51	4	29.4	1.23	.....
Moscow	50	20	35.0	1.65	2.2
Murray	50	0	29.4	2.66	6.0
Newport	45	4	30.6	3.12	5.2
Oakley	49	10	31.6	1.20	3.0
Ola	50	− 2	28.2	.....	.....
Paris	43	−11	19.3	1.36	10.0
Payette	53	5	33.6	1.51	.....
Pearl	.....	.....	.....	2.26	.....
Pollock	54	20	39.8	1.81	.....
Poplars	.....	.....	.....	1.59	.....
Porthill	46	9	31.0	2.28	6.0
St. Maries	52	11	35.1	2.55	2.0
Salem	.....	.....	.....	0.89	8.9
Salmon	47	−10	23.8	0.79	9.8
Soldier	46	−22	15.0	3.86	38.0
Standrod	.....	.....	.....	1.66	22.0
Twin Falls	54	11	32.8	1.10	.....
Vernon	47	− 4	26.2	2.62	.....
Westlake	.....	.....	.....	2.37	.....
Weston	46	− 4	26.6	1.70	5.5
Illinois.					
Albion	66	− 5	30.4	2.44	16.5
Aledo	55	− 2	26.6	2.28	0.5
Alexander	63	− 4	29.5	2.47	6.0
Antioch	50	− 9	23.0	2.40	3.0
Ashton	51	− 1	24.5	2.72	1.5
Astoria	57	0	27.7	1.29	1.0
Aurora	54	0	25.7	2.52	T.
Beardstown	.....	.....	.....	1.42	2.0
Bloomington	62	2	29.8	1.57	0.5
Bushnell	58	0	29.2	2.00	.....
Carlinville	66	− 8	30.4	3.06	9.4
Carlyle	.....	.....	...	1.78	11.7
Carrollton	66	− 4	31.7	4.45	9.5
Charleston	65	−11	28.6	1.54	5.9
Chester	64	6	33.7	2.58	11.2
Cisne	68	− 8	31.0	1.90	16.0
Coatsburg	60	− 2	27.8	2.19	3.0
Cobden	76	− 6	34.8	2.36	3.0
Colchester	59	1	29.2	1.91	0.2
Decatur	65	− 9	29.4	1.90	2.5
Dixon	54	− 2	23.6	2.46	.....
Dwight	58	1	28.3	1.76	T.
Equality	71	− 8	34.1	1.99	6.0
Flora	63	−15	27.3	2.33	13.0
Friendgrove	65	− 5	31.1	2.06	11.0
Galva	54	− 1	25.0	2.19	1.3
Grafton	.....	.....	.....	3.17	13.0

Stations.	Temperature. (Fahrenheit.) Maximum.	Minimum.	Mean.	Precipitation. Rain and melted snow.	Total depth of snow.
Illinois—Cont'd.	°	°	°	*Ins.*	*Ins.*
Greenville	67	− 2	30.8	3.07	15.5
Griggsville	61	− 1	30.9	2.26	.....
Halfway	68	− 7	32.8	2.24	7.0
Havana	60	3	30.1	1.37	.....
Henry	57	2	28.7	1.70	1.0
Hillsboro	66	− 7	31.2	2.42	10.5
Hoopeston	62	− 8	27.8	1.52	1.7
Joliet	58	3	28.0	2.30	T.
Kishwaukee	51	− 4	23.7	1.64	2.0
Knoxville	53	− 1	27.4	2.13	0.2
Lagrange	59	2	26.2	2.50	T.
Laharpe	57	0	28.0	2.50	T.
Lanark	50	− 6	22.8	1.79	2.3
Lincoln	54	0	28.1	2.10	0.8
Loami	.....	.....	.....	2.09	6.0
McLeansboro	68	− 8	31.6	2.74	13.0
Martinsville	65	− 6	29.4	1.55	7.0
Martinton	64	− 4	27.4	1.77	0.5
Mascoutah	63	− 8	31.2	3.35	19.0
Mattoon	65	1	34.8	1.22	4.7
Minonk	58	1	28.1	1.43	1.0
Monmouth	55	− 1	26.8	2.12	T.
Morrison	53	− 2	25.0	2.24	2.5
Morrisonville	64	−11	29.2	2.60	8.2
Mount Carmel	.....	.....	.....	2.52	17.0
Mount Vernon	68	− 3	32.2	2.78	17.5
New Burnside	68	−11	32.7	2.54	7.2
Olney	65	− 6	30.7	2.33	14.8
Ottawa	56	3	28.5	2.26	T.
Palestine	66	−10	30.2	2.25	9.0
Pana	63	− 4	29.6	2.33	7.5
Paris	64	− 3	29.5	0.65	.....
Philo	63	−13	27.1	1.86	1.8
Plumhill	66	−12	31.2	2.16	15.0
Pontiac	60	3	29.4	1.78	T.
Rantoul	63	− 7	29.0	1.50	1.7
Raum	71	− 5	33.8	2.13	4.5
Riley	49	− 2	24.0	1.96	1.1
Robinson	65	− 7	29.6	1.83	11.5
Rockford	50	− 3	24.6	2.28	8.5
Rushville	58	0	29.8	1.90	3.5
St. Charles	55	− 1	26.2	2.92	1.7
St. John	68	2	33.2	3.65	12.0
Shobonier	68	−10	30.4	2.40	14.5
Streator	59	2	27.4	1.99	5.0
Sullivan	64	− 7	28.8	1.97	6.5
Sycamore	56	− 1	23.8	3.03	1.0
Tilden	65	−11	32.5	2.64	12.0
Tiskilwa	51	0	25.6	2.28	0.3
Tuscola	64	−12	20.7	1.83	5.7
Urbana	62	− 7	27.4	1.11	2.0
Walnut	54	1	27.5	2.87	1.0
Warsaw	.....	.....	.....	2.84	1.0
Winchester	60e	2e	29.2e	2.38	5.0
Windsor	64	−15	28.2	1.80	8.7
Winnebago	50	− 3	23.0	2.17	5.0
Yorkville	54	1	25.4	0.83	T.
Zion	51	− 7	20.9	1.26	7.0
Indiana.					
Anderson	64	−10	28.0	1.01	5.5
Angola	57	− 3	25.9	1.12	2.0
Auburn	60d	− 9e	21.2d	0.78	
Bedford	69	− 5	31.6	0.87	6.0
Bloomington	65	− 1	30.5	2.05	9.0
Bluffton	62	−19	24.2	1.79	7.0
Butlerville	65	−11	29.4	1.52	8.2
Cambridge City	64	−15	24.6	1.16	7.5
Columbus	70	−11	28.5	1.47	9.0
Connersville	64	−13	28.6	0.77	6.5
Crawfordsville	64	−10	28.2	0.73	2.8
Delphi	63	−13	25.4	0.68	3.5
Elkhart	60	− 2	25.7	1.04	1.2
Farmersburg	65	−13	28.8	1.68	.....
Farmland	63	−10	27.9	1.36	10.0
Fort Wayne	61	− 7	27.5	1.03	2.0
Franklin	65e	−15e	26.0e	1.16	10.8
Greencastle	64	− 6	30.8	1.08	7.5
Greenfield	65	− 5	29.8	0.80	3.5
Greensburg	67	− 3	30.3	1.24	6.5
Hammond	56	5	28.4	3.30	7.0
Holland	69	−10	33.7	1.46	14.0
Huntington	63	− 8	27.3	1.10	4.0
Jeffersonvile	67	− 2	32.8	1.20	8.0
Knox	57	− 9	26.7	1.16	5.2
Kokomo	64	−19	27.2	0.95	4.0
Lafayette	63	−12	26.6	0.58	2.5
Laporte	56	− 8	25.4	1.70	.....
Lima	57	− 4	24.6	0.40	T.
Logansport	62	− 9	25.6	0.44	2.3
Madison	69	− 5	31.6	2.45	9.2
Marengo	68	−17	30.4	3.04	17.1
Marion	62	−14	27.7	1.20	5.0
Markle	62	0	29.0	0.50	2.0
Mauzy	62	−16	27.0	1.14	8.5
Moores Hill	66	− 7	29.5	1.22	7.2
Mount Vernon	72	− 4	32.0	1.75	13.0
Northfield	61	−18	25.2	1.27	3.5
Paoli	69	− 7	33.0	2.12	15.5

TABLE II.—*Climatological record of cooperative observers*—Continued.

Stations.	Temperature. (Fahrenheit.)			Precipitation.	
	Maximum.	Minimum.	Mean.	Rain and melted snow.	Total depth of snow.
Indiana—Cont'd.	°	°	°	*Ins.*	*Ins.*
Plymouth	57	— 9	24.0	1.06	1.3
Princeton	68	— 5	32.6	2.27	18.0
Rensselaer	61	— 8	27.8	1.22	2.0
Richmond	65	—15	26.6	0.61	5.9
Rochester	62	— 9	27.2	0.74	2.2
Rockville	63	— 6	28.4	0.88	4.0
Rome	69	— 5	35.0	1.86	9.5
Salem	66	— 5	31.2	1.23	10.5
Scottsburg	67	—12	30.9	1.68	11.5
Seymour	69	— 8	30.9	0.93	T.
Shelbyville	67	—15	28.2	0.81	7.2
South Bend	57	— 6	24.0	1.28	4.0
Syracuse	58	— 7	27.3	1.12	4.0
Terre Haute	64	— 6	31.6	2.22	12.4
Valparaiso	.....	.....	.....	1.82	1.5
Vevay	69	— 9	31.6	1.65	9.0
Vincennes	70	— 5	30.4	2.04	10.0
Washington	67	— 6	29.8	2.33	10.5
Indian Territory					
Ardmore	75	10	44.6	2.20	
Calvin	.....	.....	.....	1.13	1.0
Durant	72	10	41.8	3.16	
Fairland	71	— 4	38.4	1.04	4.0
Fort Gibson	.....	.....	.....	1.07	2.5
Hartshorne	58	12	37.4	3.28	
Healdton*	78	9	43.5	.....	T.
Marlow	80	8	42.0	0.20	T.
Muskogee	71	2	40.3	0.67	
Okmulgee	74	7	41.6	6.46	0.2
Pauls Valley	77	7	41.6	0.80	T.
Ravia	75	12	44.2	1.91	
Stillwell	69	1	36.8	1.60	
Vinita	70	1	38.2	0.62	2.0
Wagoner	66	2	39.4	0.98	3.0
Webbers Falls	73	5	40.3	1.17	1.0
Iowa.					
Afton	60	— 8	26.9	1.00	4.0
Albia	62	— 6	24.3	1.99	3.0
Algona	52	—20	19.8	1.46	10.0
Allerton	55	— 5	28.4	2.11	1.4
Alta	55	—16	19.1	1.61	11.0
Alton	58	—17	21.8	1.08	7.9
Amana	55	—11	24.4	1.60	3.6
Ames	58	—16	24.3	0.28	5.5
Atlantic	63	—16	26.9	0.99	6.5
Audubon	60	—19	25.8	0.53	5.0
Baxter	57	—11	23.4	0.20	0.5
Bedford	55	— 7	27.8	1.71	5.2
Belleplaine	51	—14	21.4	1.88	10.8
Bonaparte	60	— 3	27.4	2.47	0.5
Boone	58	— 9	21.4	1.52	10.5
Britt	54	—18	20.2	0.96	5.2
Buckingham	.....	.....	.....	1.26	.....
Burlington	59	0	28.7	2.40	.....
Carroll	63	—22	22.8	1.79	17.0
Cedar Rapids	56	—11	21.5	0.60	2.2
Chariton	60	— 7	27.0	1.60	5.0
Clarinda	65	— 6	26.2	1.54	9.5
Clearlake	50	—13	20.7	0.40	3.0
College Springs	62	— 4	29.0	1.32	9.0
Columbus Junction	57	— 2	27.0	2.10	0.8
Corning	60	— 6	26.7	1.03	5.5
Corydon	62	— 6	28.4	2.03	.....
Creston	60	— 7	26.0	0.65	3.5
Cumberland	.....	.....	.....	0.50	5.0
Decorah	48	—23	18.2	0.71	5.8
Delaware	48	— 9	20.4	0.43	2.9
Denison	61	—22	24.6	1.25	7.5
Desoto	60	—24	26.6	0.61	4.5
Dows	54	—17	20.8	1.02	5.5
Earlham	59	—22	24.8	1.17	3.5
Elkader	51	—25	20.4	1.00	8.0
Elliott	60	— 7	28.0	0.73	5.0
Estherville	56	—18	19.5	0.58	4.5
Fayette	47	—27	17.6	0.99	7.0
Forest City	53	—15	18.8	1.15	4.5
Fort Dodge	57	—19	19.9	0.67	6.5
Fort Madison	.....	.....	.....	2.29	1.0
Galva	51	—16	22.0	1.17	11.7
Gilman	.....	.....	.....	0.88	2.0
Glenwood	64	— 8	29.2	0.70	7.0
Grand Meadow	46	—14	18.6	1.17	7.0
Greenfield	60	—15	26.2	1.00	6.1
Grinnell	56	—12	22.8	0.91	3.5
Grundy Center	49	—13	21.4	0.80	5.0
Guthrie Center	60	—23	25.3	1.34	10.0
Hampton	55	—13	21.8	1.04	8.9
Hancock	61	— 8	27.0	1.14	5.2
Hanlontown	52	—18	19.1	0.56	5.5
Harlan	60	—15	25.4	0.88	5.8
Hopeville	62	— 5	27.6	1.08	.....
Humboldt	55	—17	21.4	0.25	2.0
Idagrove	58	—23	23.9	0.97	10.0
Independence	47	—10	20.4	0.47	2.8
Indianola	61	—12	26.0	1.32	4.4
Inwood	59	—32	21.4	0.21	3.3
Iowa City	54	—10	22.0	1.73	3.0
Iowa Falls	53	—17	19.8	1.32	8.5
Jefferson	60	—18	25.8	0.88	8.0
Keosauqua	61	— 1	25.6	2.77	1.5
Knoxville	61	— 8	27.1	1.35	4.0
Lacona	.....	.....	.....	1.63	17.3
Larrabee	57	—20	21.3	1.57	12.0
Leclaire	.....	.....	.....	2.51	T.
Lemars	58	—17	23.1	1.16	10.5
Lenox	60	— 7	27.0	2.35	3.5
Leon	61	— 4	28.3	1.63	4.8
Little Sioux	64	—12	27.6	1.60	9.8
Logan	61	—14	26.8	1.00	9.0
Maple Valley	.....	.....	.....	1.55	11.0
Maquoketa	55	—14	22.6	1.42	3.5
Marshalltown	57	—15	21.0	0.66	4.4
Mason City	44	—13	21.3	1.55	7.5
Massena	65	—12	27.4	1.39	9.2
Mountayr	64	— 5	29.6	1.78	4.2
Mount Pleasant	57	— 3	26.4	2.91	T.
Mount Vernon	55	— 7	23.6	1.30	5.3
Muscatine	.....	.....	.....	2.78	0.2
New Hampton	44	—14	18.7	1.09	8.0
Northwood	45	—15	21.1	1.07	4.7
Odebolt	58	—14	23.6	1.92	7.0
Ogden	57	—11	24.2	1.34	11.8
Olin	52	—11	23.8	1.84	5.8
Onawa	62	—10	26.8	1.69	9.7
Osage	44	—14	19.2	1.56	9.1
Oskaloosa	60	— 7	25.5	0.78	2.8
Ottumwa	59	— 3	26.6	2.67	.....
Pacific Junction	64	— 8	28.3	0.90	7.5
Pella	59	— 6	27.0	1.35	4.1
Perry	53	—17	24.4	0.80	8.1
Plover	57	—21	19.5	0.44	4.5
Pocahontas	55	—18	21.6	1.52	8.5
Redoak	66	— 2	31.6	1.58	10.0
Ridgeway	49	—13	20.6	1.32	6.4
Rock Rapids	60	—21	21.8	0.35	3.5
Rockwell City	56	—15	22.6	2.35	13.0
Sac City	56	—17	21.9	1.87	13.8
St. Charles	63	—12	27.5	0.94	3.8
Sheldon	62	—23	21.2	1.07	10.5
Sibley	59	—19	18.6	0.19	2.0
Sidney	64	— 8	27.8	0.60	6.0
Sigourney	53	— 6	25.9	1.97	3.5
Sioux Center	59	—18	21.6	0.60	6.0
Stockport	60	— 3	28.2	2.70	0.5
Storm Lake	55	—19	17.8	1.08	10.8
Stuart	59	—15	24.8	1.29	11.6
Thurman	64	— 8	27.6	1.10	4.7
Tipton	55	0	26.2	1.27	.....
Toledo	54	—12	23.2	0.95	.....
Vinton	49	—16	22.4	0.30	3.0
Wapello	55	0	27.2	2.72	0.5
Washington	59	— 4	26.4	2.56	.....
Washta	58	—24	23.6	1.15	8.5
Waterloo	48	—17	20.6	1.20	6.5
Waukee	58	—13	25.0	1.46	9.5
Waverly	45	—18	20.2	1.43	9.4
Webster City	55	—19	22.9	1.68	5.0
Westbend	54	—20	20.4	1.01	1.7
Whitten	53	—15	21.7	0.50	5.0
Wilton Junction	46	— 2	25.0	1.30	2.8
Winterset	58	—14	26.0	0.95	7.5
Woodburn	60	—12	26.6	1.60	3.0
Zearing	55	—16	22.6	0.75	5.5
Kansas.					
Abilene	.....	.....	.....	0.44	.....
Alton	74	— 4	36.0	0.50	4.0
Anthony	.....	.....	.....	0.58	T.
Atchison	69	0	33.7	1.30	2.5
Baker	69	— 2	31.3	1.43	5.0
Beloit	.....	.....	.....	0.40	.....
Blue Rapids	.....	.....	.....	0.50	0.9
Burlington	73	1	37.4	0.78	0.5
Clay Center	72	— 2	35.2	0.56	T.
Coffeyville	70	5	36.8	.....	.....
Colby	76	— 2	34.6	0.15	0.9
Columbus	68	1	36.0	1.18	1.8
Cottonwood Falls	74	0	37.0	0.70	1.1
Cunningham	75	0	36.9	0.60	0.5
Dresden	76	— 3	35.0	0.50	2.0
Eldorado	74	1	37.9	0.66	0.4
Ellinwood	72	1	37.0	0.25	0.2
Ellsworth	72	1	36.4	0.22	0.3
Emporia	73	— 1	35.4	1.52	4.0
Englewood	74	0	38.0	0.74	3.0
Enterprise	74	— 1	36.2	0.36	T.
Eureka	.....	.....	.....	0.64	0.8
Fall River	74	1	37.4	1.20	T.
Farnsworth	81	— 3	36.0	0.30	T.
Forsha	75	0	37.5	0.40	0.5
Fort Scott	73	2	38.4	1.58	1.2
Frankfort	72	0	34.6	1.34	3.5
Fredonia	73	— 1	37.2	1.34	T.
Garden City	78	— 2	35.2	0.43	0.2
Garnett	72	— 4	37.8	1.25	T.
Gove	75	— 1	34.0	0.32	0.2
Grenola	75	— 1	36.2	1.61	T.
Harrison	68	— 4	32.8	0.46	1.0
Hays	76	— 3	35.6	0.37	T.
Hess	76	— 3	35.2	0.97	1.0
Horton	70	— 1	33.1	1.20	2.5
Hoxie	77	— 2	33.9	0.53	1.0
Hugoton	78	1	38.2	0.40	.....
Hutchinson	75	0	37.2	0.52	1.0
Independence	71	3	37.4	0.95	0.1
Jetmore	74	— 3	37.3	0.44	T.
Jewell	77	— 3	33.6	0.51	1.0
La Crosse	74	— 3	36.4	0.24	T.
Lakin	79	— 2	35.1	0.02	.....
Larned	70	— 7	33.8	0.35	T.
Lebo	71	— 1	34.6	1.07	1.5
Lindsborg	.....	.....	.....	0.10	.....
Macksville	70	— 2	37.2	0.37	T.
McPherson	72	0	35.3	0.28	T.
Madison	69[a]	— 1[b]	35.8[c]	0.50	1.0
Manhattan	74	0	35.6	1.60	T.
Manhattan	71	1	34.8	0.46	0.3
Marion	.....	.....	.....	0.20	0.5
Medicine Lodge	75[b]	10[m]	37.4[b]	0.75	T.
Minneapolis	73	— 1	34.4	0.34	0.8
Moran	69	0	36.6	1.67	0.5
Mounthope	70	.....	.....	0.56	1.0
Neosho Rapids	.....	.....	.....	0.98	2.0
Ness City	.....	.....	.....	0.35	.....
Norton	75	— 4	34.0	0.12	1.0
Norwich	73	3[n]	38.8	.....	T.
Oberlin	.....	.....	.....	0.60	2.0
Osage City	.....	.....	.....	0.58	1.4
Oswego	69	1	37.2	1.14	0.5
Ottawa	.....	.....	.....	1.59	1.5
Pittsburg	70	1	35.7	1.46	0.5
Plainville	69	2	.....	0.57	2.0
Pleasanton	67	— 1	35.8	2.68	2.0
Pratt	70	2	37.2	0.51	.....
Republic	67	— 3	32.6	0.56	0.5
Rome	77	1	38.0	0.48	T.
Russell	74	— 3	36.2	0.39	T.
Salina	71	— 1	37.2	0.30	T.
Sedan	70	3	36.8	0.60	T.
Toronto	70	— 1	34.1	1.15	2.5
Ulysses	72	— 2	35.4	0.85	1.0
Valley Falls	71	— 1	34.2	1.30	1.8
Wakeeney	79	— 4	35.2	0.40	.....
Wakeeney (near)	.....	.....	.....	0.39	0.1
Wallace	76	0	34.1	0.19	0.2
Wamego	74	0	34.0	0.75	0.9
Winfield	74	2	37.4	1.00	T.
Kentucky.					
Alpha	70	11	40.0	1.76	1.0
Anchorage	67	—12	32.0	1.60	7.0
Bardstown	69	— 2	34.6	1.50	6.5
Beattyville	72	2	33.6	1.43	4.0
Beaver Dam	70	— 6	33.2	2.06	3.0
Berea	69	— 2	36.7	1.84	2.0
Blandville	66	— 1	34.5	1.61	4.5
Bowling Green	67	2	37.8	2.12	6.8
Burnside	70	9	37.6	2.48	1.0
Cadiz	72	— 1	36.3	1.51	2.0
Calhoun	70	— 4	35.8	2.30	4.2
Catlettsburg	73	— 1	35.2	2.26	14.0
Earlington	71	— 6	33.0	2.33	4.5
Edmonton	69	2	36.4	2.43	2.1
Eubank	68	1	32.8	1.82	2.6
Falmouth	.....	.....	.....	1.27	7.0
Farmers	69	— 6	33.2	1.67	8.0
Frankfort	67	6	33.9	1.38	7.2
Greensburg	70	1	33.6	2.29	1.5
High Bridge	75	5	35.0	1.37	4.5
Hopkinsville	70	0	36.8	2.36	5.0
Irvington	68	— 2	35.3	1.33	7.5
Jackson	75	7	38.2	1.08	3.0
Leitchfield	68	— 1	34.2	1.91	3.5
Loretto	73	— 3	35.6	1.57	6.7
Lynnville	70	1	36.9	1.28	1.8
Manchester	70	6	35.8	2.17	1.5
Marion	69	— 2	35.7	2.46	6.0
Maysville	73	— 5	31.4	2.11	9.0
Mount Sterling	66	2	33.3	2.30	8.5
Owensboro	73	0	34.5	1.71	7.6
Owenton	65	— 3	32.9	1.75	9.0
Paducah	73	4	36.6	1.86	3.0
Richmond	70	0	35.1	1.89	.....
St. John	66	— 4	31.2	1.72	10.0
Scott	68	— 6	30.8	1.02	5.8
Shelby City	69	4	33.7	2.38	4.0
Shelbyville	70	—10	31.2	1.58	9.8
Taylorsville	67	— 7	33.2	2.10	9.0
Williamsburg	73	6	38.1	1.65	6.0
Williamstown	69	— 3	32.8	1.39	8.7
Louisiana.					
Abbeville	81	28	50.8	5.88	
Alexandria	83	22	49.4	1.73	
Amite	81	26	48.6	3.65	
Baton Rouge	77	27	48.8	3.32	
Burnside	80	30	51.8	5.41	

TABLE II.—*Climatological record of cooperative observers*—Continued.

Stations.	Temperature. (Fahrenheit.)			Precipitation.	
	Maximum.	Minimum.	Mean.	Rain and melted snow.	Total depth of snow.
Louisiana—Cont'd.	°	°	°	*Ins.*	*Ins.*
Calhoun	75	20	46.5	.....	
Cameron	69	29	50.4	4.21	
Cheneyville	80	26	47.7	5.48	
Clinton	80	25	49.3	5.09	0.2
Collinston	78[c]	22[c]	46.0[c]	0.63	0.5
Covington	77	26	47.7	3.94	
Donaldsonville	80	30	52.4	3.73	
Farmerville	.....	.....	.....	0.84	
Franklin	81	30	51.4	4.34	
Georgetown	79	17	48.3	1.25	T.
Grand Coteau	81	27	51.6	3.99	
Hammond	79	27	49.6	3.42	
Houma	77	31	51.4	2.37	
Jennings	82	27	50.8	3.46	
Lafayette	81	28	50.2	4.44	
Lake Charles	84	26	51.5	4.50	
Lakeside	80	28	51.3	3.86	
Lawrence	.....	.....	.....	2.89	
Libertyhill	76	21	48.2	1.76	0.5
Logansport	.....	.....	.....	1.16	
Melville	80	26	49.9	4.10	
Minden	.....	.....	.....	0.82	
Monroe	73	27	.....	0.50	T.
Morgan City	.....	.....	.....	1.42	
New Iberia	78	27	52.7	5.25	
Opelousas	80	27	49.8	4.16	
Oxford	76[f]	19[f]	49.1[f]	1.48	
Plain Dealing	74	19	47.8	1.78	1.2
Rayne	82	28	51.6	4.70	
Reserve	79[c]	32[c]	50.5[c]	5.18	
Robeline	.....	.....	.....	0.40	T.
Schriever	80	30	51.4	2.61	
Simmesport	.....	.....	.....	2.68	
Southern University	.....	.....	.....	2.49	
Sugar Experiment Station	75	34	52.0	2.49	
Sugartown	74	24	50.0	2.23	
Maine.					
Bar Harbor	52	— 7	24.4	2.70	10.0
Cornish	53	— 9	23.0	1.76	15.0
Danforth	.....	.....	.....	2.22	13.0
Debsconeag	45	—17	17.9	2.20	22.5
Fairfield	48	—14	20.6	2.52	15.0
Farmington	47	—20	19.5	1.89	19.0
Ft. Fairfield	46	—28	12.7	1.56	17.0
Gardiner	48	—13	21.9	1.98	11.8
Greenville	44[d]	—17[d]	20.6[d]	1.23	.....
Houlton	44	—14	18.9	2.10	25.0
Lewiston	49	—10	21.8	1.59	14.0
Madison	48	—18	19.0	2.99	16.5
Mayfield	44	—15	20.2	2.01	20.0
Millinocket	45	—24	17.3	3.45	29.5
North Bridgton	52	—13	23.0	1.52	16.0
Oquossoc	48	—23	14.2	2.64	24.2
Orono	49	—15	21.9	2.27	12.5
Patten	45	—22	15.7	3.80	28.0
Rumford Falls	46	—17	19.0	1.68	19.6
The Forks	.....	.....	.....	2.05	22.0
Thomaston	45	— 7	24.6	0.90	6.0
Vanburen	45	—30	12.5	1.45	14.0
Winslow	47	—14	21.3	1.33	11.0
Maryland.					
Annapolis	.....	.....	.....	2.87	.....
Bachmans Valley	60	2	30.2	1.68	4.0
Cambridge	68	7	36.8	5.06	7.5
Cheltenham	64	6	33.3	2.70	6.5
Chestertown	59	8	34.4	2.95	3.5
Chewsville	59	— 6	30.4	1.55	10.7
Clearspring	59	3	29.3	1.29	4.0
Coleman	61	8	35.0	2.49	5.0
Collegepark	63	6	34.1	2.11	4.0
Cumberland	.....	.....	.....	0.48	0.6
Darlington	58	4	32.2	2.90	4.5
Deerpark	66	—15	26.7	1.33	8.5
Denton	.....	.....	.....	3.05	6.0
Easton	62	8	35.2	3.83	3.7
Fallston	56	6	31.9	2.39	3.5
Frederick	62	6	34.0	1.35	5.5
Frostburg	.....	.....	.....	1.20	4.1
Grantsville	64	9	26.7	0.85	6.0
Greenspring Furnace	60	3	32.2	0.87	3.9
Harney	.....	.....	.....	1.63	5.6
Jewell	66	8	35.4	2.71	7.0
Johns Hopkins Hospital	.....	.....	.....	2.06	1.5
Keedysville	61	— 5	33.0	1.48	10.0
Lake Montebello	61	6	34.0	2.05	7.0
Laurel	64	9	34.7	2.23	7.5
McDonogh	62	4	32.0	2.57	3.2
Mount St. Marys College	61	3	32.3	2.11	12.0
New Market	59	3	32.2	1.82	9.5
Oakland	63	—13	27.2	0.80	7.0
Pocomoke City	62	12	37.0	4.99	6.0
Porto Bello	66	10	36.4	3.60	1.0
Prince Fredericktown	66	7	35.2	3.25	8.0
Princess Anne	65	11	36.0	6.57	3.5
Solomons	62	13	34.8	3.68	7.0
Sudlersville	60	8	35.3	3.83	.....
Takoma Park	64	5	31.4	1.22	8.0
Van Bibber	56	5	32.8	2.95	.....
Maryland—Cont'd.	°	°	°	*Ins.*	*Ins.*
Westernport	63	3	30.5	0.46	3.4
Woodstock	61	5	34.0	.....	6.2
Massachusetts.					
Amherst	52	— 5	24.2	2.73	13.0
Bluehill (summit)	60	— 5	27.1	3.27	5.1
Cambridge	60	— 1	28.6	3.05	.....
Chestnuthill	61	— 1	30.0	3.17	4.2
Concord	56	— 3	25.4	2.46	7.5
East Templeton[•1]	50	—10	23.2	2.74	9.0
Fallriver	55	1	29.4	3.97	2.0
Fitchburg	53	— 5	26.2	2.29	10.5
Framingham	59	— 6	27.4	2.88	.....
Hyannis	.....	.....	.....	4.08	2.3
Jefferson	.....	.....	.....	2.81	8.5
Lawrence	56	— 5	26.3	2.27	9.0
Lowell	52	— 2	28.0	2.59	.....
Ludlow Center	46	—10	22.0	2.01	12.0
Middleboro	58	0	29.8	4.60	1.7
Monson	52	— 5	23.7	2.27	10.5
New Bedford	54	3	30.8	4.21	1.0
Pittsfield	.....	.....	.....	2.04	13.0
Princeton	.....	.....	.....	2.60	9.5
Provincetown	52	7	32.8	3.86	1.0
Salem	.....	.....	.....	2.63	5.0
Somerset[•1]	58	— 4	29.5	2.79	2.0
Sterling	.....	.....	.....	2.50	10.0
Taunton	59	— 3	28.4	4.16	.....
Weston	57	— 3	26.6	2.14	5.1
Williamstown	54	— 8	22.4	1.89	14.5
Winchendon	.....	.....	.....	2.21	11.0
Worcester	55	— 4	27.3	2.05	8.5
Michigan.					
Adrian	63	— 5	24.5	0.60	.....
Agricultural College	57	—10	23.6	1.12	2.3
Allegan	.....	.....	.....	1.90	2.0
Alma	55	—10	22.2	2.64	6.0
Ann Arbor	59	— 4	24.8	0.71	0.4
Arbela	55	—10	23.4	1.54	4.0
Baldwin	56	—31	16.4	1.55	8.0
Ball Mountain	55	— 9	22.7	0.91	2.3
Baraga	.....	.....	.....	1.05	10.5
Battlecreek	57	— 7	24.2	1.17	T.
Bay City	53	—10	22.2	1.61	7.0
Benzonia	45	— 6	21.1	2.45	16.4
Berlin	54	—10	21.3	1.19	2.3
Big Rapids	50	—23	20.4	3.06	7.0
Birmingham	58	— 6	24.0	1.14	1.8
Bloomingdale	57	— 6	24.6	1.50	1.0
Calumet	47	— 7	15.4	2.20	27.0
Carsonville	57	—11	21.2	0.65	6.5
Cassopolis	51	— 6	23.0	1.60	2.0
Charlevoix	48	—16	20.2	1.70	17.0
Charlotte	57	— 6	24.9	0.67	T.
Chatham	52	—26	14.0	1.71	17.1
Cheboygan	50	—15	17.5	1.10	11.0
Clinton	59	— 7	24.1	0.46	T.
Coldwater	64	— 7	27.0	1.64	2.0
Concord	56	— 6	24.4	0.80	T.
Dundee	64	— 5	25.8	0.74	1.0
Eagle Harbor	49	— 5	17.6	3.25	.....
East Tawas	48[c]	—12[c]	19.9[c]	1.28	3.7
Eloise	60	— 6	24.2	0.35	1.2
Flint	59	— 6	23.3	1.00	3.0
Gaylord	.....	.....	.....	0.55	5.5
Grand Marais	47	— 7	16.2	1.91	20.1
Grape	61	— 5	24.5	0.59	1.0
Grasslake	55	— 6	22.4	1.03	1.0
Grayling	50	—27	16.9	3.05	15.0
Harbor Beach	58	—16	24.0	2.71	7.0
Harrison	57	—11	23.2	0.67	2.7
Harrisville	51	—22	18.5	1.50	6.0
Hart	55	—13	20.0	2.38	17.0
Hastings	58	— 7	24.4	1.10	11.0
Hayes	54	— 6	21.6	1.77	1.9
Highland	.....	.....	.....	1.73	11.0
Holland	61	—11	25.4	14.0	2.5
Howell	55	—10	22.2	3.06	5.0
Humboldt	45[c]	—36[c]	11.2[c]	0.76	0.8
Ionia	.....	.....	.....	1.00	10.0
Iron Mountain	47	—25	14.6	1.80	2.5
Iron River	47	—29	10.8	0.32	4.0
Ironwood	46	—16	13.6	0.20	2.0
Ivan	45	—20	18.2	1.30	13.0
Jackson	58	— 3	25.4	1.94	18.5
Jeddo	54	— 9	22.6	0.73	1.0
Kalamazoo	58	— 4	24.8	1.07	5.8
Lansing	58	— 5	24.5	1.47	T.
Ludington	47	—10	24.4	1.37	2.5
Mackinac Island	.....	.....	.....	2.40	19.0
Mackinaw City	51	—17	15.2	1.10	11.0
Mancelona	52	—24	18.2	1.30	4.0
Maple Ridge	48	—24	13.8	1.20	4.0
Menominee	48	— 8	19.4	0.70	7.0
Mio	51	—23	17.3	1.30	13.0
Montague	45	—10	22.3	2.03	10.2
Mount Clemens	59	— 2	23.5	1.25	7.5
Muskegon	51	— 7	23.0	0.89	2.2
Michigan—Cont'd.	°	°	°	*Ins.*	*Ins.*
Newberry	.....	.....	.....	1.88	7.0
Old Mission	48	— 5	19.4	1.30	12.5
Olivet	55	— 4	23.6	1.31	8.0
Omer	54	—19	19.0	1.60	3.2
Onaway	52	—17	17.0	1.98	6.0
Owosso	51	—14	22.1	0.92	6.0
Petoskey	49	—14	20.4	1.15	0.9
Plymouth	59	— 6	24.6	0.40	4.0
Pontiac	59	— 8	23.1	0.70	2.0
Port Austin	50	— 7	21.1	1.42	T.
Powers	49	—23	13.2	1.90	6.0
Reed City	50	—24	19.9	0.60	6.0
Saginaw (W. S.)	57	—10	23.0	1.35	8.5
St. James	44	—11	18.1	2.00	6.5
St. Johns	60	— 8	24.2	4.52	27.0
St. Joseph	55	— 4	26.6	1.42	T.
Slocum	47	—16	20.6	2.56	1.8
Somerset	57	— 8	23.0	1.92	.....
South Haven	59	— 9	22.7	0.50	T.
Staunton	48	—10	21.2	2.02	6.0
Thomaston	50	—30	12.6	1.77	3.1
Thornville	54	—10	24.1	1.20	12.0
Traverse City	48	— 8	22.9	1.50	6.5
Vassar	57	—12	22.4	2.16	20.0
Wasepi	59	— 5	25.2	1.25	4.2
Webberville	57	— 9	23.0	1.20	1.0
West Branch	48	—16	18.6	1.74	1.5
Whitefish Point	47	—16	16.8	1.25	10.5
Woodlawn	51	—27	14.7	1.43	13.6
Ypsilanti	59	— 7	23.0	0.82	1.5
Minnesota.					
Albert Lea	52	—19	18.6	0.90	9.0
Alexandria	49	—33	9.0	0.24	4.0
Amboy	55	—15	19.8	0.26	3.0
Angus	36	—32	.....	0.05	.....
Ashby	36	—26	10.2	0.22	2.8
Bagley	51	—47	5.4	.....	.....
Beardsley	57	—27	18.2	0.62	8.0
Beaulieu	35	—40	6.4	0.20	4.0
Bemidji	52	—38	8.8	0.13	.....
Bird Island	53	—19	18.8	0.06	0.5
Caledonia	47	—16	17.3	0.87	5.5
Collegeville	50	—21	14.4	0.21	2.8
Crookston	38	—32	2.9	0.10	1.0
Detroit	45	—45	3.1	0.05	.....
Faribault	48	—15	17.9	0.06	1.5
Farmington	45	—16	16.6	0.20	2.0
Fergus Falls	47	—26	13.3	0.13	1.3
Glencoe	52	—16	17.9	0.10	1.0
Grand Meadow	45	—17	16.0	1.42	8.5
Hallock	37	—33	2.6	0.10	1.0
Hinckley	43	—30	11.4	.....	.....
Hovland	50	—29	18.8	0.35	12.8
Lake Winnibigoshish	44	—40	8.6	0.12	1.4
Leech	47	—36	7.6	0.06	1.0
Little Falls	45	—30	8.4	0.50	5.0
Long Prairie	49	—37	10.3	0.15	1.8
Luverne	57	—21	20.4	0.12	2.0
Lynd	57	—21	19.6	0.04	0.5
Mankato	.....	.....	.....	0.16	2.0
Mapleplain	50	—21	14.9	0.32	3.1
Milaca	45	—32	10.4	.....	.....
Milan	56	—27	16.6	0.55	5.5
Montevideo	55	—25	17.8	0.11	1.0
Mora	45	—37	11.2	0.42	5.2
Morris	51	—27	14.6	0.47	4.2
Mount Iron	47	—36	8.2	0.01	0.1
New London	53	—26	12.2	0.33	3.0
New Richland	52	—13	20.8	0.17	1.8
New Ulm	56	—11	22.8	0.37	3.8
Park Rapids	42	—37	3.6	0.18	1.8
Peterson	.....	.....	.....	0.62	7.6
Pine River	49	—44	8.9	0.05	0.8
Pipestone	53	—20	17.8	0.05	0.5
Pokegama Falls	49	—39	8.8	0.15	2.6
Redwing	50	—16	19.9	0.25	4.0
Reeds	.....	.....	.....	0.13	6.0
Rolling Green	50	—15	19.0	0.30	3.0
St. Charles	45	—23	15.8	0.60	.....
St. Cloud	48	—25	14.5	0.26	1.2
St. Peter	55	—12	20.6	0.18	1.8
Sandy Lake Dam	44	—42	7.4	0.14	.....
Shakopee	50	—16	17.4	0.50	5.0
Stillwater	.....	.....	.....	0.40	3.1
Thief River Falls	37	—41	3.2	0.30	3.0
Tonka	.....	.....	.....	0.23	.....
Two Harbors	50	—26	14.1	0.27	5.0
Wabasha	48	—27	17.8	0.45	6.0
Wadena	45	—38	7.4	0.27	2.5
Windom	57	—17	22.2	0.20	2.0
Winnebago	56	—15	19.4	0.22	2.0
Winona	50	—27	15.1	0.35	5.0
Worthington	53	—22	18.8	0.10	1.0
Zumbrota	45	—16	17.0	T.	T.
Mississippi.					
Aberdeen	69	18	41.6	1.26	
Austin	74	15	44.9	1.55	
Batesville	72	16	42.2	2.40	

TABLE II.—*Climatological record of cooperative observers*—Continued.

Stations.	Temperature. (Fahrenheit.) Maximum.	Minimum.	Mean.	Precipitation. Rain and melted snow.	Total depth of snow.
Mississippi—Cont'd.	°	°	°	*Ins.*	*Ins.*
Bay St. Louis	71	32	50.6	3.74	
Biloxi	74	32	51.8	3.77	
Booneville	67	17	41.4	1.53	T.
Brookhaven	81	27	48.0	1.80	
Canton	76	22	47.1	1.13	T.
Columbia				2.95	
Columbus	71	22	42.6	2.03	
Corinth	67	13	38.7	1.21	T.
Crystal Springs	78	23	47.0	1.42	
Duck Hill	75	16	45.3	1.85	
Edwards	79	24	48.4	1.11	T.
Enterprise				2.30	
Fayette	80	20	47.0	1.65	
Fayette (near)				1.51	T.
Greenville *b*	79	20	45.3	1.43	T.
Greenwood	79	19	45.5	0.92	
Hattiesburg	74	24	47.8	2.64	
Hazlehurst	79	24	47.8	1.20	
Hernando	70	12	41.3	1.28	T.
Holly Springs	70	13	40.2	1.46	0.5
Indianola	74	20	44.0	0.82	T.
Jackson	80	24	46.8	1.59	f.
Kosciusko	74	20	44.0	2.84	0.1
Lake	74	22	44.1	1.64	T.
Lake Como	74	24	46.4	1.69	
Leakesville	75	25	49.3	2.92	
Louisville	78	20	45.4	2.34	0.4
McNeill	75	29	50.0	4.76	
Magee	77	24	46.6	0.99	
Magnolia	80	26	49.6	3.63	
Merrill				2.32	
Natchez	81	27	51.6	2.49	
Nitta Yuma	75	20	45.0	0.83	
Patmos				0.75	0.5
Pearlington	75	28	49.0	3.17	
Pecan	73	28	51.3	4.75	
Pittsboro	73	16	43.6	2.11	
Pontotoc	69	15	42.8	1.47	
Port Gibson	81	20	45.3	0.86	
Porterville	73	19	44.6	1.72	T.
Quitman	74	24	46.9	1.87	
Ripley	68	12	42.4	1.80	
Shelby	75	12	45.6	1.86	
Shoccoe	79	21	48.5	1.18	0.5
Shubuta				2.05	
Stonington				1.21	T.
Suffolk	79	25	49.2	1.97	
Swan Lake	74	18	43.8	1.00	
Tchula	77	21	47.8	1.26	T.
Tupelo	72	12	41.6	1.65	
University	72	14	43.8	1.86	
Utica	79	24	47.2		
Walnutgrove	75[d]	21[d]	45.0[d]	1.44	
Watervalley	70	11	43.6	1.13	T.
Waynesboro	76	22	46.6	2.69	
Woodville	77	25	49.0	3.39	
Yazoo City	77	21	46.4	1.08	T.
Missouri.					
Albany				2.08	4.0
Appleton City	69	— 2	34.9	2.25	2.0
Arlington				2.53	4.8
Arthur	70	0	37.5	1.74	0.5
Avalon	66	— 5	31.0	3.95	4.0
Belle	65	0	32.4	2.93	3.0
Bethany	63	— 4	29.4	1.87	4.0
Birchtree	65	1	35.8	2.12	4.0
Bolivar	70	— 8	35.5	1.11	0.8
Boonville				2.85	
Brunswick	70	— 2	29.9	3.70	1.7
Cape Girardeau				2.02	4.0
Caruthersville	72	6	38.4	1.71	3.0
Conception	66	— 3	30.8	0.85	3.0
Darksville	68	— 4	31.8	3.44	4.3
Dean	72	— 3	38.6	1.55	4.0
Decaturville	69	— 6	35.4	2.18	4.0
De Soto	66	— 3	34.2	2.93	6.5
Doniphan	69	— 3	36.3	2.21	5.0
Downing				3.21	3.5
Eldorado Springs	71	— 3	36.5	2.95	1.0
Fairport				2.59	4.0
Fayette	69	— 3	30.6	3.07	9.0
Fulton	70	— 3	33.0	2.59	4.8
Gallatin *[1]	64	4	31.3	2.34	2.3
Gano	69	— 5	34.6	2.35	8.3
Glasgow				3.30	3.0
Goodland	65	—10	33.2	2.16	7.0
Gorin				3.06	4.0
Grant City	64	— 4	30.4	1.40	2.5
Harrisonville	67	— 1	32.2	2.66	3.3
Hazlehurst				3.20	5.0
Hermann				2.44	0.7
Houston	65	—11	34.8	2.49	4.0
Ironton	69	—13	32.8	2.52	6.2
Jackson	72	— 7	34.6	2.62	5.0
Jefferson City	69	— 2	30.8	1.95	3.2
Kidder	65	— 2	30.9	2.36	3.6
Koshkonong	66	1	37.0	2.90	4.0
Lamar	70	— 2	36.8	1.29	1.0

Stations.	Temperature. (Fahrenheit.) Maximum.	Minimum.	Mean.	Precipitation. Rain and melted snow.	Total depth of snow.
Missouri—Cont'd.	°	°	°	*Ins.*	*Ins.*
Lamonte				2.53	4.0
Lebanon	67	— 5	33.8	2.78	6.1
Lexington	62	0	32.6	3.99	5.8
Liberty	68	— 4	33.2	2.64	2.7
Lockwood	68	— 7	35.1	1.33	1.0
Louisiana	65	— 4	31.2	3.08	9.0
Macon	68	— 3	31.4	3.31	4.5
Marblehill	71	— 8	34.0	1.86	5.0
Marshall	68	0	32.1	2.45	3.7
Maryville	65	— 4	27.8	2.30	4.3
Mexico	69	— 5	29.2	2.66	9.3
Monroe	63	2	29.2	2.33	5.1
Montgomery City	67	— 6	31.0	1.90	4.0
Mountain Grove	65	— 4	34.8	2.89	4.5
Mount Vernon	70	— 9	34.9	1.20	3.0
Neosho	71	—10	37.6	1.58	4.0
New Haven	68	0	34.2	4.29	14.5
New Madrid				1.42	4.0
New Palestine	69	0	34.8	2.23	3.4
Oakfield	66	— 1	33.0	3.26	12.0
Olden	68	— 7	36.0	2.47	0.4
Oregon	67	— 3	31.8	1.70	4.0
Osceola				1.93	1.2
Princeton	65	— 3	29.2	2.48	4.5
Rockport				1.67	4.0
Rolla				3.18	7.0
St. Charles	68	— 2	32.8	3.13	10.0
St. Joseph				1.68	3.5
Sarcoxie				1.21	2.7
Sedalia	69	— 1	34.4	2.52	2.5
Seymour	67	— 5	34.8	1.79	3.5
Sikeston	69	— 3	35.4	1.70	4.0
Steffenville	63	0	30.0	2.88	7.5
Sublett	64	— 3	28.6	4.40	5.0
Trenton	61	0	30.4	2.42	4.0
Unionville	66	— 6	26.3	3.41	7.0
Versailles	73	— 5	35.8	2.28	4.0
Warrensburg	70	— 1	34.6	3.06	
Warrenton	66	— 3	30.0	3.19	13.0
Warsaw	73	— 6	35.4	2.83	4.0
Wheatland				2.44	3.5
Willowsprings	63	—12	33.1	2.08	3.5
Windsor	68	— 3	34.3	2.66	2.3
Zeitonia	68	—12	34.7	2.45	6.0
Montana.					
Absarokee				0.33	3.2
Adell	56	—21	26.6	0.90	9.0
Anaconda	60	4	30.6	1.22	
Augusta	63	—14	29.2	0.45	4.5
Bear Creek	48	—10	24.8	1.28	5.4
Billings	62	— 9	32.2	0.48	4.0
Boulder	55	— 6	28.7	0.40	5.2
Bozeman	48	— 4	25.9	0.75	9.6
Butte	48	1	28.4	1.70	17.0
Canyon Ferry	52	— 4	28.4	0.57	5.8
Cascade	60	— 9	33.0	0.85	10.0
Chester	50	—25	21.6	0.10	1.0
Chinook	61	—16	25.4	0.55	
Choteau	63	—10	30.0	0.08	T.
Clear Creek	60	—10	27.4		
Columbia Falls	47	— 4	27.4	1.56	6.5
Cooke				5.20	52.0
Copper				1.32	17.8
Crow Agency	57	—14	28.1	0.70	5.0
Culbertson	48	—29	13.6	0.05	
Dayton	49	6	29.4	0.41	0.9
Decker	59	—11	28.3	0.20	2.0
Deerlodge	51	0	26.9	0.19	1.9
Dillon	52	0	31.2	0.25	2.5
Ekalaka	55	—12	26.2		
Evans	58	—15	29.6	1.24	13.0
Fallon	61	—21	24.2	0.13	1.0
Fort Benton	64	—14	29.0	0.43	1.8
Fort Harrison	60	0	29.0		
Fort Logan	70	—15	27.8	1.20	12.0
Glasgow	54	—22	17.2	0.05	0.5
Gold Butte				0.41	4.0
Graham	58	—12	27.6	0.52	0.7
Grayling	38	—31	16.6	0.97	18.0
Greatfalls	55	—10	30.1	0.77	
Hamilton	60	9	33.7	0.66	9.5
Highwood				0.58	4.0
Homepark				1.20	7.5
Jordan	60	—20	24.5	0.25	3.0
Lakeview				1.30	16.0
Lame Deer	59[f]	—11[f]	30.0[f]	0.90	2.0
Lewistown	66	— 9	31.2	0.60	10.5
Livingston	55	— 8	32.4	0.70	5.5
Lodge Grass	58	—16	24.6	0.45	1.0
Malta	53	—16	23.1	T.	T.
Marion	46	7	30.4		
Marysville	54	— 8	26.0	2.60	26.0
Millets Ranch				0.40	3.8
Missoula	50	5	28.6	0.26	1.5
Nye				1.07	15.1
Ovando	45	—10	23.4	0.64	6.0
Parrot	55	0	30.4	0.51	5.1
Philipsburg	55	0	29.8	0.49	3.4

Stations.	Temperature. (Fahrenheit.) Maximum.	Minimum.	Mean.	Precipitation. Rain and melted snow.	Total depth of snow.
Montana—Cont'd.	°	°	°	*Ins.*	*Ins.*
Plains	53	11	31.9	0.50	5.0
Poplar	51	—27	14.5	T.	T.
Raymond				0.21	5.0
Redlodge	52	—20	25.4	0.56	10.6
Ridgelawn	52	—34	14.0	0.20	2.0
St. Pauls	70	—12	30.4	0.80	8.9
St. Peter	54	— 9	30.2	0.78	10.0
Saltese				2.48	24.0
Springbrook	58	—20	21.9	0.80	3.0
Steele	67	—11	30.2	0.88	7.5
Tokna	58	—25	20.6	0.06	0.7
Utica	62	—15	28.6	0.63	8.0
Virginia City	48[e]	0	27.7[e]	0.64	6.5
Warrick				0.20	2.0
Whitlash				0.08	
Wibaux	59[e]	24[f]	20.8[e]		
Wolf Creek	55	— 7	31.0	0.46	4.8
Wolsey	50	—24	20.8	0.79	17.2
Yale	58	—15	27.8	0.70	7.0
Nebraska					
Agate	64	— 7	28.8	0.23	2.2
Agee *[1]	64	—16	22.2	0.13	1.5
Ainsworth	70	— 9	28.2	0.08	1.8
Albion	66	—13	27.2	0.77	3.0
Alliance				T.	T.
Alma	66	— 2	31.6	0.64	6.0
Arapaho				0.50	2.0
Arcadia				0.93	4.0
Ashland	66	— 7	29.6	1.05	9.2
Auburn	67	— 2	32.0	1.49	4.0
Aurora	61	— 7	31.0	0.50	1.5
Beatrice	67	— 3	32.0	1.35	1.0
Beaver	73	— 2	33.4	0.66	3.0
Bellevue	64	— 5	30.4	1.13	8.0
Blair	63	—11	28.1	0.67	6.1
Bloomfield	65	—17	25.7	0.63	6.5
Bluehill				0.85	
Bradshaw				0.80	5.5
Bridgeport	67	— 7	29.9	T.	T.
Broken Bow	64	— 8	30.6	0.22	2.2
Burchard				1.08	1.0
Burge				0.45	4.0
Burwell				0.30	3.0
Callaway	64	— 5	30.6	0.34	5.0
Central City				1.50	6.0
Chester				0.43	
Clearwater	65	—20	25.6	0.42	5.2
Cody				0.16	1.5
Columbus	63	—10	25.8	1.13	4.0
Crawford				0.86	8.5
Crete	62	— 6	31.4	0.72	2.8
Culbertson	73	— 4	34.3	0.40	4.0
Curtis	62	—13	28.2	0.60	6.0
David City	61	—10	29.2	1.66	10.5
Dawson	70	— 2	33.4	2.68	12.0
Dubois				1.19	2.7
Duff				0.30	3.0
Dunning				0.45	4.5
Ellis				0.90	4.0
Ericson				0.22	2.2
Ewing				0.70	7.0
Fairbury	71	— 5	29.9	1.06	
Fairmont	64	—10	28.0	0.75	4.0
Fort Robinson	63	—13	27.2	0.99	5.5
Franklin	70	— 4	32.2	0.53	
Fremont	66	— 9	27.0	0.90	6.5
Fullerton				0.70	6.5
Geneva	65	— 7	31.8	0.58	1.0
Genoa (near)	64	—15	28.5	1.01	6.2
Gering				1.12	
Gordon				0.30	3.0
Gosper				0.75	4.5
Gothenburg	66	— 5	30.6	0.60	6.0
Grand Island	62	— 9	29.8	0.80	4.0
Grant	67	— 8	32.7	1.20	3.0
Greeley				0.40	4.0
Guide Rock				0.89	3.5
Haigler				0.25	3.0
Halsey	70	— 8	29.2	0.17	
Hartington	65	— 8	24.6	1.60	16.0
Harvard	63	— 8	29.2	0.65	
Hastings *[1]	64	— 8	30.0	1.51	14.0
Hayes Center	72	— 6	33.1	0.40	4.0
Hay Springs	65	—12	27.8	0.91	6.0
Hebron	67	— 4	31.8	0.66	1.5
Hendley				0.38	3.5
Hickman				0.58	3.2
Holbrook	66	— 4	29.4	0.60	2.2
Holdrege	66	— 4	31.7	0.70	7.0
Hooper *[1]	58	— 8	23.9	1.73	11.0
Imperial	71	— 8	32.0	0.52	5.0
Kearney	65	— 6	31.6	0.46	5.4
Kennedy	70	— 6	30.8	0.25	2.5
Kimball	65	—10	29.8	0.20	2.0
Kirkwood	70	—12	27.2	0.35	3.5
Leavitt	66	— 7	26.5	0.96	
Level				0.55	
Lexington	67	— 5	29.0	0.46	3.0

TABLE II.—*Climatological record of cooperative observers*—Continued.

Stations.	Temperature. (Fahrenheit.)			Precipitation.	
	Maximum.	Minimum.	Mean.	Rain and melted snow.	Total depth of snow.
Nebraska—Cont'd.	°	°	°	*Ins.*	*Ins.*
Loup	59	−12	29.2	0.50	4.0
McCook				0.70	6.0
McCool				0.53	1.5
Madison	66	−13	26.0	1.10	11.0
Marquette				0.62	.....
Mason				0.45	.....
Minden	66	− 4	30.4	1.02	5.2
Monroe				1.46	8.6
Nebraska City				1.00	5.0
Nemaha				0.54	2.0
Norfolk	67	−15	25.9	1.01	10.0
North Loup	67	−10	28.0	0.40	4.0
Oakdale	64	−15	23.6	0.98	9.9
Oakland	61	−12	26.8	1.91	19.0
Odell				1.12	1.5
Ord				0.97	.....
Osceola				1.05	5.0
Palmer				0.40	4.0
Palmyra [1]	68	− 5	31.8	0.69	4.5
Pawnee City	69	− 1	32.3	0.86	2.0
Plattsmouth				0.95	8.0
Plymouth	67	6	36.6	0.80	.....
Purdum	69	−10	28.4	0.20	2.0
Ravenna	64	−10	30.0	0.82	6.2
Republican				0.29	3.5
Rulo				2.05	.....
St. Libory				1.18	10.0
St. Paul	65	− 9	30.4	0.53	2.5
Santee	66	−13	25.5	0.64	6.5
Schuyler				1.15	7.5
Seward	64	− 8	28.6	1.00	3.5
Smithfield				0.60	6.0
Stanton	66	−14	25.6	1.86	12.0
Strang				0.40	0.5
Stratton				0.40	4.0
Stromsburg				1.08	6.0
Superior	66	− 7	30.8	0.31	1.0
Syracuse				0.55	5.0
Tablerock				1.26	3.0
Tecumseh	68	− 7	30.9	1.20	3.0
Tekamah	64	−11	26.1	1.60	8.5
Turlington	65	− 6	29.6	1.16	9.0
University Farm	67	− 6	31.2	0.54	.....
Wahoo				0.60	6.0
Wakefield	61	−17	24.2	1.50	14.0
Wauneta				0.90	5.0
Weeping Water				1.06	8.0
Westpoint	60	−12	27.8	0.84	8.4
Whitman				0.07	0.8
Wilber				0.70	0.8
Wilsonville				0.20	2.5
Winnebago	60	−24	24.0	1.15	11.0
Wisner				0.82	8.2
Wymore				0.64	1.8
York	65	− 8	30.2	0.85	6.5
Nevada.					
Amos	60	17	34.4	0.48	.....
Battle Mountain	64	20	42.2	.....	.....
Beowawe [1]	60	20	37.9	0.92	8.0
Carlin [1]	52	5	32.4	0.55	5.5
Carson City	62	21	40.6	1.66	6.9
Columbia	61	21	41.3	0.59	2.0
Cranes Ranch				2.14	.....
Dyer	67	14	40.6	0.50	
Elko [1]	48	10	29.5	.....	.....
Fallon	69	11	40.7	.....	.....
Geyser	60	8	35.6	0.75	3.0
Golconda [1]	50	19	34.3	.....	.....
Halleck	48	− 2	24.7	.....	.....
Humboldt	62	20	38.6	T.	T.
Lewers Ranch	60	24	40.9	3.90	14.0
Lovelocks	60	15	38.8	0.20	1.0
Martins	77	20	44.1	0.87	.....
Mill City	48	18	32.0	0.30	1.0
Morey	56	14	35.9	1.36	.....
Palisade	60	8	34.4	1.35	9.0
Palmetto	58	14	37.6	3.11	4.0
Pioche	60	6	33.7	1.19	3.0
Potts	53	8	33.1	0.45	5.0
San Jacinto	51	9	31.4	1.15	6.0
Tecoma	50	10	28.5	1.20	12.0
Verdi [1]	65	8	39.3	.....	.....
Wabuska	67	13	39.7	0.12	
Wadsworth	68	16	38.8	.....	
Wells [1]	48	8	27.2	1.40	14.0
Wood	47	2	28.2	1.66	.....
New Hampshire.					
Alstead	45	−12	22.4	3.52	20.0
Bartlett				2.82	24.5
Berlin Mills	48	−30	15.4	1.83	18.0
Bethlehem	51	−19	17.7	2.52	25.0
Bretton Woods				0.62	6.0
Brookline [1]	54	− 7	25.1	1.96	11.0
Durham	55	− 4	25.0	1.26	5.0
Franklin Falls	55	−12	22.6	2.19	18.0
Grafton	53	−18	19.2	2.03	13.0
Hanover	50	−18	18.8	2.23	21.6
Keene	53	−15	21.8	2.28	14.0

Stations.	Temperature. (Fahrenheit.)			Precipitation.	
	Maximum.	Minimum.	Mean.	Rain and melted snow.	Total depth of snow.
New Hampshire—Cont'd.	°	°	°	*Ins.*	*Ins.*
Littleton	48	−18	17.1	1.86	19.0
Nashua	54	− 4	26.3	2.51	11.0
Newton	52	− 6	24.4	1.62	7.0
North Woodstock				2.10	.....
Plymouth	48	−13	14.8	2.32	20.3
New Jersey.					
Asbury Park	51	5	31.7	1.77	2.0
Bayonne	61	3	31.1	2.10	4.5
Belvidere	55	− 1	27.8	3.54	8.5
Bergen Point	61	2	30.6	2.10	3.5
Beverly	61	4	32.5	2.48	3.2
Bridgeton	62	7	34.3	3.39	4.0
Canton				2.66	1.7
Cape May C. H.	55	8	33.8	3.39	4.3
Charlotteburg	54	− 5	25.9	2.17	8.0
Clayton	64	5	33.2	2.46	0.5
College Farm	60	− 1	30.4	2.04	3.3
Dover	51	− 2	26.0	2.25	8.0
Elizabeth	56	2	32.2	2.10	5.5
Englewood	56	2	29.2	2.76	5.5
Flemington	59	2	30.6	2.12	4.0
Friesburg	60	6	32.8	2.58	3.0
Imlaystown				1.94	3.0
Indian Mills	62	5	33.3	2.20	3.5
Jersey City	55	4	31.4	2.83	6.6
Lakewood	62	4	32.4	2.14	0.5
Lambertville	58	3	31.4	2.62	5.0
Layton	54	−12	24.4	3.08	9.0
Moorestown	61	4	32.2	2.06	5.2
Newark	57	1	31.1	1.91	4.9
New Brunswick	60	3	32.2	2.12	4.0
Newton	56	− 4	26.4	2.83	9.2
Oceanic	63	5	32.2	1.95	6.0
Paterson	55	4	32.0	3.49	8.2
Phillipsburg	55	− 1	28.8	3.03	7.6
Plainfield	54	1	29.6	2.37	5.6
Rancocas				2.06	3.6
Rivervale	53	− 7	27.0	1.90	10.0
Sandy Hook	60	7	31.4	2.06	5.0
Somerville	55	3	30.3	2.33	4.0
South Orange	52	1	29.4	2.16	7.5
Sussex	55	− 4	26.9	2.75	10.0
Toms River	61	3	32.1	2.28	T.
Trenton	60	6	33.4	2.26	0.3
Tuckerton	54	2	31.8	3.63	1.5
Vineland	62	5	33.1	2.62	1.2
Woodbine	58	5	33.1	3.85	2.0
New Mexico.					
Alamagordo	72	24	46.2	0.74	.....
Albert	73	12	40.7	0.11	1.0
Albuquerque	64	22	43.0	T.	T.
Alma	75	19	43.8 [2]	1.00	.....
Alto				0.83	10.3
Artesia	76	19	44.4	0.62	1.5
Bellranch	76	11	39.6	0.51	0.5
Bloomfield	62	17	38.6	0.22	T.
Brice	72	26	49.0	1.14	
Cambray				0.72	
Carlsbad				0.68	3.0
Chama	52	2	29.6	1.10	11.0
Cimarron	69	5	35.0	0.25	3.0
Cliff	73	20	46.5	1.53	.....
Cloudcroft	49	11	30.2	1.72	15.5
Datil	63	15	36.4	1.70	19.0
Deming	73	22	45.2	0.63	T.
Dorsey	68	8	35.6	0.27	3.0
Eagle Rock Ranch	65	7	34.4	0.32	4.0
Elizabethtown	49	4	27.4	0.22	T.
Elk	69	15	40.6	0.74	7.5
Estancia	63	8	37.2	0.33	4.0
Fairview				0.80	.....
Fort Bayard	66	19	41.6	1.63	4.2
Fort Stanton	64	16	38.1	0.35	3.5
Fort Union	63	5	33.0	0.58	7.0
Fort Wingate	62	21	37.4	1.05	10.5
Gallinas Spring	66	10	37.6	0.81	5.0
Glen	76	19	42.8	0.25	0.8
Gran Quivira				0.74	6.7
Hillsboro	70	28	44.6	1.28	T.
Hope				0.53	2.5
Laguna	65	20	39.6	0.37	1.0
Lagunita	71	16	40.2	0.48	2.5
Lake Valley				1.66	0.2
Las Vegas	66	10	36.2	1.02	8.5
Logan	75	12	39.6	0.60	.....
Lordsburg	76	24	49.3	1.07	.....
Los Alamos				0.66	8.0
Los Lunas	68	21	42.8	0.40	.....
Luna	60	13	36.0	0.56	3.0
Magdalena	66	15	38.4	2.11	15.0
Manuelito				1.56	11.0
Maxwell				0.62	3.8
Mesilla Park	75	20	46.6	0.68	.....
Mimbres				0.42	1.0
Mineral Hill				0.66	11.0
Monument	79	13	45.0	0.40	3.0
Mountainair	62 [3]	13	37.4	1.11	7.2
Nara Visa	72	8	41.0	0.53	1.0

Stations.	Temperature. (Fahrenheit.)			Precipitation.	
	Maximum.	Minimum.	Mean.	Rain and melted snow.	Total depth of snow.
New Mexico—Cont'd.	°	°	°	*Ins.*	*Ins.*
Palma				0.65	7.0
Patterson				0.49	T.
Portales	74	6	41.2	0.54	1.5
Raton	67	8	39.0	0.56	6.0
Redrock				0.83	.....
Rincon	75	23	47.0	0.87	T.
Rociada	57	6	30.6	0.18	3.0
Rosa				0.05	0.5
San Marcial	74	22	46.8	.....	.....
San Rafael	60	20	39.4	0.75	8.5
Socorro	66	18	40.6	1.41	5.0
Springer				0.35	3.5
Strauss				0.20	
Taos	60	17	35.7	0.75	9.5
Tres Piedras	73	8	28.8	0.10	0.5
Tucumcari	73	14	40.4	0.70	1.0
Valley				0.10	1.2
Vermejo	62	− 1	30.6	T.	T.
Weed				1.10	
Whiteoaks				0.43	5.0
Windsor	58	5	31.0	1.60	.....
New York.					
Adams				1.35	11.5
Addison	68	−10	26.1	0.61	3.2
Akron				0.68	.....
Amsterdam				1.84	20.0
Angelica	62	−14	22.8	0.58	4.5
Appleton	69	− 4	25.5	0.91	.....
Arcade	62	−22	20.6	0.67	6.7
Athens	53	−10	24.2	1.67	15.0
Atlanta	64	−10	24.6	0.25	0.1
Atwater				1.10	6.7
Auburn	64	−12	24.7	0.65	7.0
Avon	67	− 6	25.0	0.43	1.5
Baldwinsville	64	−18	24.7	1.47	6.0
Ballston Lake	47	−22	18.2	2.94	25.0
Bedford	53	− 3	28.6	2.03	5.2
Berlin	51	−15	21.2	3.22	2.1
Blue Mountain Lake				1.10	9.5
Bolivar	64	−14	23.4	0.61	2.0
Bouckville	55	−23	21.6	1.74	9.5
Brockport	66	− 3	25.6	0.93	9.5
Cape Vincent	58	−15	20.6	0.92	4.5
Carmel	50	− 5	24.4	2.74	8.0
Carvers Falls	47	−26	16.1	2.97	28.0
Chatham	56	−13	24.4	2.82	15.5
Chazy	47	−18	18.7	1.85	10.5
Coeymans	51	− 9	21.0	1.62	18.3
Cold Spring Harbor	53	6	29.6	2.43	6.0
Cooperstown	54	−21	18.4	2.55	16.5
Cortland	61	−21	24.6	1.06	7.2
Cutchogue	55	6	31.1	2.20	3.0
Dannemora	54	−18	19.4	0.86	5.0
Dekalb	65	−33	17.5	0.72	10.5
De Ruyter	58	−30	20.1	1.75	11.4
Easton				2.76	25.5
Elba	64	− 5	23.4	1.05	8.0
Elmira	65	− 9	25.0	0.92	4.5
Faust	63	−33	17.6	0.99	14.5
Fayetteville	66	−22	23.1	1.02	6.0
Fort Plain	47	−14	20.8	2.10	20.5
Franklinville	66	−17	21.2	1.05	7.5
Gabriels				1.55	9.0
Ganse voort				3.68	27.5
Glens Falls	48	−20	18.0	3.26	23.0
Gloversville	48	−25	18.2	3.01	30.5
Greenfield	48	−20	19.3	2.76	27.0
Greenwich	44	−16	18.8	2.60	19.0
Griffin Corners	63	−22	21.3	1.97	20.0
Harkness	50	−22	19.0	1.33	11.8
Haskinville				0.61	4.7
Hemlock	60	− 8	23.3	0.52	3.5
Hunt	75	−12	25.2	0.90	3.5
Indian Lake	62	−30	18.0	1.32	16.0
Ithaca	62	−11	23.4	1.21	8.7
Jamestown	66	−14	24.8	0.77	7.0
Jeffersonville	57	−23	21.4	3.13	18.0
Keene Valley	62	−28	19.7	1.06	10.2
Lake George	52	−14	19.2	3.12	29.1
Le Roy	69	− 4	24.7	0.93	7.0
Liberty	52	− 8	21.6	1.87	6.0
Littlefalls, City Res.	50	−21	19.4	1.72	16.0
Lockport	65	− 4	25.0	0.84	.....
Lowville	57	−26	18.6	1.08	7.0
Lyndonville				0.50	5.0
Lyons	66	− 7	26.6	1.23	9.0
Middletown	52	− 3	26.4	2.23	10.5
Mohonk Lake	48	− 9	24.2	2.81	12.0
Moira	57	−24	18.8	1.48	10.0
Mount Hope	52	0	28.1	3.14	7.5
Newark Valley				1.39	8.5
New Lisbon	57	−24	18.8	1.98	13.0
North Hammond	61	−22	19.5	0.70	1.0
North Lake	57	−29	18.4	2.26	12.0
Ogdensburg	54	−20	20.3	0.58	5.7
Oneonta	67	−20	24.0	2.52	26.0
Oriskany Falls	60	−24	22.1	1.38	8.5
Otto	65	− 8	25.5	0.54	.....

TABLE II.—*Climatological record of cooperative observers*—Continued.

Stations.	Temperature. (Fahrenheit.) Maximum.	Minimum.	Mean.	Precipitation. Rain and melted snow.	Total depth of snow.
New York—Cont'd.	°	°	°	*Ins.*	*Ins.*
Oxford	56	−19	22.6	2.08	12.0
Oyster Bay	53	5	31.0	2.17	6.0
Palermo				1.29	2.1
Perry City	61	−15	21.6	1.18	8.0
Plattsburg	46	−15	20.1	1.15	11.5
Port Jervis	58	− 6	24.8	2.28	8.5
Potsdam	60	−31	19.5	1.32	11.5
Richland				1.50	10.0
Ridgeway	67	− 2	25.6	1.25	7.5
Ripley	68	− 9	25.8	0.40	5.0
Romulus	65	− 8	26.2	0.85	6.0
Salisbury Mills				2.35	10.0
Saranac	63	−28	18.4	1.67	13.4
Scarsdale	56	2	30.3	1.80	5.5
Setauket	57	6	31.2	2.57	6.0
Shortsville	66	− 5	24.9	0.58	4.0
Skaneateles				1.46	
Southampton	50	7	32.0	3.15	4.0
South Canisteo	65	−14	24.0	0.98	5.5
South Kortright	62	−30	21.0	2.24	18.0
South Schroon	50	−21	18.7	1.91	20.0
Spier Falls	49	−18	19.3	4.00	32.0
Taberg	55	−32	21.1	1.62	10.5
Ticonderoga				1.79	25.6
Volusia	64	−10	22.9	0.71	7.2
Wappinger Falls	50	−12	23.8	3.50	19.0
Warwick				2.11	9.0
Watertown	63	−21	21.4	1.30	10.5
Waverly	65	−16	24.8	1.02	6.5
Wedgwood	62	− 8	23.4	0.95	4.3
West Berne	55	−21	21.6	2.43	21.0
Westfield	66	− 5	24.4	1.52	10.8
Windham	61	−20	21.2	1.86	17.5
Youngstown				0.60	3.6
North Carolina.					
Battleboro				4.71	T.
Beaufort	64	24	46.2	5.57	
Brevard	67	8	38.8	1.60	
Brewers	70	7	39.2	1.38	T.
Bryson City				1.51	T
Buck Springs	60	0	34.2	4.30	3.0
Carolcen	70	13	43.2	0.47	
Catawba				0.92	T.
Chalybeate Springs	72	10	42.0	4.35	T.
Chapelhill	72	14	40.8	3.21	T.
Eagletown	71	15	39.6	5.38	1.0
Edenton	75	17	41.0		
Fayetteville	75	15	44.6	5.69	T.
Goldsboro	72	17	42.2	4.83	T.
Graham				2.22	T.
Greensboro	73	13	41.4	1.97	
Greenville				5.16	0.5
Henderson	68	12	38.3	3.84	1.0
Hendersonville	65	11	39.3	1.21	
Horse Cove	65	11	39.6	1.70	T.
Hot Springs	69	12	42.2		
Jefferson	66	6	35.3	1.40	T.
Kinston	74	17	44.1	4.63	0.9
Lenoir	70	19	45.6	0.36	
Lexington	71	12	40.9	1.94	T
Lincolnton	75	12	43.0		
Linville	56	− 2	31.7	1.46	1.0
Louisburg	69	12	40.7	4.24	T.
Lumberton	73	18	43.6	6.34	0.5
Manteo	64	21	44.2	6.14	T.
Marion	69	9	42.2	1.14	T.
Marshall	70	9	38.5	0.55	1.0
Moncure	76	11	42.2	2.43	
Monroe	70	12	42.0	1.25	0.5
Morganton	69	9	40.8	0.73	T.
Mountairy	67	9	37.4	1.55	0.2
Mount Holly				1.56	
Murphy				0.56	1.5
Nashville	71	11	40.9	4.75	T.
Newbern	77	18	44.8	5.06	T.
Patterson[4 5]	64	12	37.8	1.74	T.
Pinehurst	73	14	45.6	2.58	T.
Pink Beds	60	4	33.8	2.62	
Pittsboro	72	11	41.5	2.27	T.
Randleman				1.97	
Reidsville	71	12	40.6	2.02	2.5
Rockingham	71	17	44.8	1.88	
Salem	69	10	40.2	1.59	
Salisbury	71	13	40.5	1.42	
Sapphire	63	11	38.0	2.57	
Saxon	70	8	38.2	1.69	2.2
Scotland Neck	74	16	43.2	5.17	0.2
Selma	70	16	42.2	3.55	
Settle	77	10	43.2	2.64	1.4
Sloan	76	17	44.8	5.02	T.
Snowhill	74	13	42.6	4.84	T.
Southern Pines	73	13	44.9	2.69	T.
Southport	69	21	47.2	5.53	
Statesville	71	10	41.2	1.75	T.
Tarboro	73	15	42.0	4.96	0.2
Vade Mecum	70	5	40.0	1.93	1.0
Washington	78	16	44.3	8.44	T.
Waynesville	67	5	37.9	1.53	
Weldon	73	14	39.6	5.08	0.4
Whiteville	74	18	45.8	6.56	T.
North Dakota.					
Amenia	40	−31	5.0	0.00	
Ashley	40	−39	10.0	0.06	0.6
Bottineau	38	−25	5.2	0.25	2.5
Buford	50	−36	15.2	0.20	2.0
Cando	41	−37	5.0	0.00	
Chilcot	45	−27	15.8	0.07	0.7
Coalharbor	38	−28	12.0	0.12	1.2
Denhoff				T.	T.
Dickinson	50	−28	17.2	0.40	4.0
Donnybrook	40	−27	11.4	0.05	0.5
Dunseith	42	−31	6.4	T.	T.
Edgeley	47	−33	12.4	T.	T
Edmore	47	−34	5.6	0.25	2.5
Fargo	40	−32	7.8	0.24	2.4
Flasher	44	−31	15.4	0.10	1.0
Forman	43	−30	15.0	0.17	1.7
Fort Berthold	45	−31	13.5	0.10	1.1
Fort Yates	49	−30	15.8	0.10	1.0
Fullerton	41	−34	12.0	0.22	1.9
Glenullin	43	−22	13.8	0.26	2.1
Grafton	40	−33	5.6	T.	T.
Hamilton	41	−31	3.6	0.06	0.6
Hannah	38	−32	4.2	0.20	2.0
Hillsboro	38	−32	7.0	0.28	2.8
Jamestown				0.10	1.0
Kulm	44	−36	12.5	0.17	1.7
LaFollette	39	−30	14.9	0.10	1.0
Langdon	39	−36	6.8		
Larimore	40	−30	4.2	0.20	2.0
Lisbon	44	−34	11.4	T.	T.
McKinney	40	−33	9.4	T.	T.
Mayville	39	−32	8.5	0.58	5.8
Medina				0.10	1.0
Medora[a]	54	−30	20.2		
Melville	43	−28	12.2	T.	T.
Milton	33	−33	4.1		
Minnewaukon [a]	41	−30	5.8		
Minot	54	−29	10.8	0.10	1.0
Minto	39[a]	−30[a]	4.6[4]		
Moyersville	40	−33	9.5	T.	T
Napoleon	40	−35	9.6	0.10	1.0
New England				0.80	8.0
Oriska	42	−28	12.0	0.32	3.2
Palermo	38	−19	15.2	T.	T.
Park River	43[a]	−26[a]	6.1[a]	0.02	0.2
Pembina	40	−29	1.4	0.40	4.0
Portal	40	−32	6.4	0.10	1.0
Pratt	38	−33	8.3	T.	T.
Rolla	44	−27	6.2	0.02	0.2
Rugby	38	−33	7.0	0.20	2.0
Sentinel Butte	57	−28	19.1	0.25	2.5
Steele	38	−33	10.1	T.	T.
University	37	−36	6.4	0.20	2.0
Wahpeton	48	−29	13.7	0.10	1.0
Willow City	38	−37	5.8		
Wishek	39	−38	10.2	0.07	0.7
Ohio.					
Akron	65	− 6	25.1	0.73	5.7
Amesville	70	−10	30.0	1.19	5.1
Atwater				0.75	5.5
Bangorville	63	− 6	26.6	1.62	9.1
Bellefontaine	64	− 5	25.7	0.86	5.2
Benton Ridge	62	−11	26.6	0.97	7.5
Bladensburg	66	−18	25.7	0.78	4.0
Bowling Green	64	−11	25.0	0.90	3.9
Bucyrus	72	− 6	28.8	1.00	9.0
Cadiz	67	− 6	28.2	1.14	7.0
Cambridge	70	−15	29.0	0.89	4.0
Camp Dennison	68	−13	29.0	1.52	6.3
Canal Dover	64	−14	25.0	1.26	6.0
Canton	63	− 7	25.8	0.85	7.0
Cardington	63	−20	25.4	0.81	5.5
Chillicothe	70	− 2	34.0	0.46	4.5
Circleville	67	− 9	28.5	0.85	6.5
Clarington	72	− 3	31.4	1.47	8.9
Clarksville	66	− 8	29.2	1.25	2.6
Cleveland[b]	63	− 2	25.4	1.70	16.6
Coalton	69	−14	29.8	1.39	7.0
Colebrook	60	−13	23.2	1.12	8.0
Dayton	66	− 7	28.4	1.11	5.5
Defiance	60	−11	26.7	0.51	1.6
Delaware	65	−12	25.5	1.20	6.4
Demos	68	− 7	28.8	1.39	3.9
Findlay	66	− 5	25.8	0.78	5.0
Frankfort	67	−14	29.3	1.08	5.0
Fremont	66	− 3	27.6	1.04	7.4
Garrettsville	65	−18	24.0	0.73	6.3
Granville	63	−10	27.6	1.23	4.7
Gratiot	65	−12	27.4	0.95	6.9
Green	69	− 3	31.0	2.43	11.5
Greenhill	64	−15	24.3	0.75	6.2
Greenville	64	− 6	27.2	0.64	4.5
Hedges	63	−15	25.6	1.18	4.2
Hillhouse	65	−15	25.0	1.40	8.5
Hiram	63	− 5	24.4	1.22	10.5
Hudson	64	−11	24.2	1.40	12.0
Ironton	70	− 4	34.2	2.76	18.5
Jacksonburg	66	− 3	28.8	1.83	10.0
Killbuck	65	− 6	26.8	1.31	5.5
Lancaster	66	−10	28.8	0.98	5.5
Lima	62	− 4	25.3	1.27	11.0
McConnelsville	69	− 7	29.2	1.17	4.7
Manara	63	−12	27.2	0.79	6.0
Mansfield				1.55	7.0
Marietta	68	0	32.5	1.84	7.0
Marion	67	− 6	27.0	0.94	9.4
Medina	65	−23	24.4	1.47	13.0
Milfordton	63	− 9	25.8	1.31	6.9
Milligan	67	−16	28.2	0.99	5.0
Millport	65	−14	25.2	1.35	6.7
Montpelier	59	−10	24.6	0.95	2.0
Napoleon	63	− 7	26.0	0.59	2.0
Nellie	64	− 5	26.6	0.81	5.0
New Alexandria	67	− 5	28.2	1.95	
New Berlin	63	− 9	24.4	0.64	3.0
New Bremen	63	−10	26.8	0.68	5.9
New Richmond	67	− 6	30.6	0.83	5.9
New Waterford	64	−12	25.4	1.23	5.0
North Lewisburg	64	− 4	26.4	1.40	5.0
North Royalton	60	− 5	25.1	2.40	19.0
Norwalk	67	−12	27.2	1.17	11.0
Oberlin	66	−12	27.4	1.76	16.3
Ohio State University	64	− 9	26.2	1.13	4.5
Orangeville	60	−16	22.8	0.85	1.0
Ottawa	64	− 9	26.0	0.80	4.8
Pataskala	65	− 7	27.5	0.88	4.6
Philo	66	− 6	29.6	0.59	4.9
Plattsburg	64	− 6	27.8	1.18	5.0
Pomeroy	68	1	30.8	1.88	10.0
Portsmouth	67	− 2	32.0	2.43	9.0
Pulse	65	−15	28.8	1.87	10.5
Rittman	66[1]	−16	25.4[c]	1.61	9.0
Rockyridge	66	− 6	26.8	0.49	2.0
Shenandoah	64	− 8	24.4	0.70	5.0
Sidney	65	− 7	27.7	0.87	6.5
Somerset	66	− 5	29.9	0.69	5.5
South Lorain	68	−12	26.8	0.85	6.5
Springfield				0.84	1.2
Summerfield	69	−10	28.4	1.35	5.4
Thurman	71	− 6	33.7	2.00	9.0
Tiffin	63	− 2	26.1	1.19	9.7
Toledo (St. Johns College)	62	− 2	26.4	0.76	3.6
Upper Sandusky	64	− 7	27.0	1.73	11.0
Urbana	62	−12	26.2	0.87	6.1
Vickery	66	−10	25.7	0.62	4.4
Warren	67	−10	25.4	1.05	7.3
Wauseon	63	− 8	24.8	0.71	2.7
Waverly	70	− 8	30.6	1.59	6.2
Waynesville	65	− 6	27.2	0.95	5.0
Wellington	65	−10	26.8	1.01	9.0
Willoughby				1.22	8.0
Wilson	65	−14	29.8	1.59	7.0
Wooster	65	−14	25.8	1.06	7.0
Zanesville				1.13	6.0
Oklahoma.					
Alva	75	7	41.0	0.50	0.3
Arapaho	77	4	41.8	0.45	
Blackburn	76	7	39.7	0.15	
Cache [c]	86	10	47.6	0.78	
Chattanooga	80			0.05	
Enid	78	4	38.5	0.40	
Erick	78	0	43.2	1.15	
Fort Reno	79	− 5	38.1	0.04	
Fort Sill	80	0	42.9	0.60	
Gage	76	− 1	39.2	0.33	
Grand	78	0	38.6	0.42	
Guthrie	78	7	42.6	0.44	T.
Harrington	72	2	40.2	0.75	
Helena	86	1	41.4	0.18	
Hennessey	75	5	43.8	0.50	
Hobart	76	8	42.8	1.12	
Jefferson	80	4	39.0	T.	
Jenkins	78	3	39.9	0.50	T.
Kenton	75	8	38.0	0.24	T.
Kingfisher	78	6	41.8	0.40	
Luther	76	6	42.0	0.22	
McComb	75	8	40.4	0.99	
Mangum	78	9	43.5	0.60	
Meeker	75	7	42.0	0.05	T
Neola	77	6	42.0	0.55	
Newkirk	72	4	38.0	0.32	
Norman	77	8	42.0	0.46	
Perry	77	4	40.4	0.23	
Sac and Fox Agency	75	9	42.2	0.65	T.
Shawnee	74	7	42.4	0.74	
Stillwater	76	5	38.0	0.27	T.
Taloga				0.50	T.
Temple	81	9	46.6	0.62	
Watonga	78	3	37.8	0.35	
Waukomis	74	7	41.3	0.20	
Weatherford				0.40	
Whiteagle	78	4	40.4	0.23	

TABLE II.—*Climatological record of cooperative observers*—Continued.

Stations.	Temperature. (Fahrenheit.) Maximum.	Minimum.	Mean.	Precipitation. Rain and melted snow.	Total depth of snow.
Oregon.	°	°	°	*Ins.*	*Ins.*
Alba				2.25	
Albany				5.96	
Alpha	61	27	45.4	14.22	
Ashland	70	31	46.4	1.25	
Astoria	62	35	46.4	9.79	
Aurora (near)	58	26	43.2	6.42	
Bay City	69	31	47.0	15.14	
Bend	59	4	34.2	1.25	8.0
Beulah	45	0	22.1	1.00	10.0
Blackbutte	52	30	40.0	8.40	
Blalock	69	25	41.2	1.36	T.
Bullrun				9.05	1.5
Burns	48	−7	23.6	1.38	7.0
Carlton	60	27	42.8	6.63	
Cascade Locks	55	32	41.8	11.54	
Coquille				7.66	
Corvallis	59	28	44.0	6.76	
Dale				2.22	1.0
Dayville	64	19	40.4	1.40	T.
Doraville	60	26	42.6	4.69	
Drain	65	26	45.9	7.63	
Echo	69	22	40.8	1.11	
Ella	65	23	38.6	0.79	
Eugene	65	27	43.4	5.99	
Fairview	71	32	48.7	11.35	T.
Falls City	57	28	42.4	15.52	
Forestgrove	72	23	42.0	7.45	T.
Gardiner	67	35	47.8	12.29	
Glendale	65	28	44.8	10.82	
Glenora	54	26	40.4	13.51	
Gold Beach	60	30	48.1	13.71	
Government Camp	53	18[a]	32.7[b]	4.26	34.0
Granite		−7		2.09	
Grants Pass	68	25	44.0	6.78	
Grass Valley	58	20	36.1	0.85	T.
Heisler	62	18	39.2	0.49	
Heppner	63	23	38.4	1.61	2.0
Hood River	50	26	39.4	4.87	
Huntington	51	5	31.0	1.53	
Jacksonville	69	30	44.7	3.49	
John Day	62	18	39.1	1.09	T.
Joseph	51	4	25.5	1.92	16.8
Kerby	63	28	44.4	15.77	
Klamath Falls	53	14	32.5	1.20	5.4
Lagrande	51	13	33.0	1.71	
Lakeview	48	5	29.6	1.59	
Lonerock	56	19	35.0	1.01	T.
McKenzie Bridge	70	23	42.4	8.40	
McMinnville	62	27	44.6	6.30	
Marshfield	64	31	47.7	10.04	
Meacham				2.98	26.0
Mill City	62	25	42.3	8.15	
Monroe	60	28	43.6	8.90	
Mount Angel	64	28	44.8	8.00	
Nehalem				13.19	
Newport	68	35	49.2	9.25	
Odell				2.33	
Ontario				1.50	
Paisley	53	15	33.1		
Pendleton	60	21	39.0	1.63	
Port Oxford	62	35	48.7	13.18	
Prineville	60	16	36.2	0.36	
Prospect				4.76	0.5
Richland	50	11	33.8	0.95	
Riverside	50	9	30.8	1.70	2.0
Salem	61	28	44.5	5.78	
Silverlake	49	6	28.4	0.55	
Sisters	58	18	35.4	0.79	6.5
Sparta	42	8	26.8	2.00	27.0
Stafford	57	28	43.4	7.39	
The Dalles	57	25	41.4	1.67	
Toledo	70	32	48.6	11.80	
Umatilla	68	23	41.4	0.89	
Vale	50	2	31.2	0.20	1.5
Van				2.20	14.0
Wallowa	49	−6	26.5	1.67	6.0
Warm Spring	64	20	39.8	1.02	0.7
Weston	55	14	33.8	2.67	0.5
Williams	70	25	46.8	5.80	
Pennsylvania.					
Aleppo	70	−6	29.9	1.24	5.0
Altoona	61	−7	25.6	0.75	
Baldwin	63	−11	26.2	0.60	2.0
Beaver Dam				0.96	3.5
Bellefonte	61	−9	29.5	1.46	6.0
Brookville				0.76	3.0
Browers				3.07	
California	71	0	32.3	1.07	2.8
Cassandra	60	−9	25.0	1.70	8.5
Centerhall	59	−10	26.1	1.91	6.8
Clarion				0.68	3.8
Claysville	70	−10	29.0	1.01	3.2
Clearfield				0.64	1.2
Coatsville	61	4	31.8	3.17	6.8
Confluence				1.15	4.0
Davis Island Dam				1.28	6.5
Derry	79	−11	31.2	1.35	4.0
Doylestown				2.86	
Pennsylvania—Cont'd.	°	°	°	*Ins.*	*Ins.*
East Mauch Chunk	56	−5	26.6	3.10	11.8
Easton	50	1	29.2	2.33	6.6
Ellwood Junction				1.26	0.8
Emporium	65	−13	25.6	0.75	1.5
Ephrata	57	0	30.0	2.75	6.5
Everett	59	−1	25.6	0.99	1.0
Forks of Neshaminy				2.52	
Franklin	67	−21	24.9	0.84	3.0
Freeport	64	−9	28.8	1.34	4.0
Gettysburg	60	1	31.0	1.21	6.8
Girardville				3.80	19.8
Gordon	56	−17	25.9	3.16	17.0
Greensboro				1.50	3.0
Greenville	65	−15	24.8	1.59	14.0
Hamburg	54	0	29.6	2.77	6.8
Hanover	66	4	34.1	1.89	5.8
Herrs Island Dam				1.22	3.8
Huntingdon	61	−5	29.7	1.60	3.5
Hyndman				0.45	
Indiana	69	1	28.0	0.36	2.1
Irwin	72	−6	30.3	1.16	5.7
Johnstown	73	−2	29.4	1.30	2.3
Lansdale				2.32	
Lawrenceville	67	−16	25.0	0.68	3.0
Lebanon	56	1	30.4	3.07	9.5
Leroy	59	−11	23.8	0.86	6.5
Lewisburg	59	−14	27.2	1.96	10.4
Lockhaven	60	−8	29.6	1.41	6.5
Lock No. 4				0.96	1.8
Lycippus	70	−6	29.6	1.37	7.2
Marion	54	1	29.5	1.66	4.0
Mifflintown	54	−14	27.6	1.27	6.8
Milford	54	−8	25.0	1.54	9.4
Montrose	55	−15	21.8	0.72	4.0
New Germantown	59	−10	29.5	1.24	8.0
Ottsville				2.36	
Parker				0.64	4.4
Penmar				1.55	8.5
Philadelphia	60	8	34.6	2.86	5.0
Pocono Lake	51	−10	24.0	3.68	12.0
Point Pleasant				2.46	
Pottsville				2.73	
Reading	58	4	30.5	2.69	8.4
Renovo				0.53	3.0
Saegerstown	65	−21	25.8	1.22	5.5
St. Marys	64	−12	23.0	0.58	3.0
Saltsburg				0.86	3.0
Seisholtzville				2.65	
Selinsgrove	58	−6	27.8	2.02	9.0
Shawmont				2.43	
Skidmore	64	−11	25.2	1.15	6.0
Smiths Corners				2.18	
Somerset	65	−8	25.2	1.79	8.1
South Eaton	58	−12	24.9	3.07	24.0
Springdale				1.35	3.9
Springmount				2.55	
State College	59	−8	25.8	1.18	4.1
Swarthmore	57	6	32.2	2.18	4.5
Towanda	60	−13	24.2	1.19	8.9
Uniontown	71	−2	29.8	1.88	7.0
Warren	68	−16	25.4	0.58	5.4
Wellsboro	60	−13	25.0	0.60	4.0
Westchester	57	3	31.6	3.13	4.8
West Newton				1.23	5.0
Wilkesbarre	59	−6	27.8	3.45	18.0
Williamsport	53	−1	29.3	1.18	5.8
Rhode Island.					
Bristol	50	4	30.2	3.74	2.0
Kingston	56	−2	28.6	4.71	4.0
Pawtucket	63	11	33.6	4.15	3.0
Providence	61	3	30.6	3.23	2.5
South Carolina.					
Aiken	72	21	46.9	2.52	
Allendale	73	28	51.3	2.36	
Anderson	70	19	45.2	1.16	1.4
Barksdale	70[c]	19[c]	43.6[c]	1.10	1.0
Batesburg	72	20	45.0	2.58	
Beaufort	73	28	50.6	2.39	
Bennettsville	73	20	44.3	2.77	0.4
Blackville	74	24	47.6	3.14	
Blair				1.21	2.1
Bowman	72	24	47.4	3.44	
Calhoun Falls				2.53	0.5
Camden				2.34	1.0
Chappells				1.34	2.0
Cheraw	72	18	45.5	2.97	0.5
Clarks Hill	72	20	46.1	1.97	
Clemson College	69	17	45.6	1.08	0.5
Conway	76	21	47.2	5.60	
Darlington	73	20	44.9	3.48	0.5
Dillon	75	20	45.5	6.46	1.0
Due West	69	21	46.7	2.00	0.5
Edisto				3.94	
Effingham				6.23	
Enoree				1.20	
Florence	73	22	44.1	4.01	
Gaffney	70	15	43.6	1.01	
Georgetown	72	20	48.2	7.26	
South Carolina—Cont'd.	°	°	°	*Ins.*	*Ins.*
Greenville	67	14	40.4	0.96	0.2
Greenwood	70	21	43.2	1.89	0.5
Heath Springs	70	17	42.9	1.60	1.0
Kingstree	72	29	50.6	4.19	
Liberty	69	12	45.1	1.60	0.5
Little Mountain	71	20	45.8	1.50	1.2
Newberry	71	20	44.8	1.36	1.0
Pelzer				1.18	
Pinopolis	70	28	48.0	1.97	
St. Matthews	71	24	46.0	3.39	
St. Stephens				3.22	
Saluda	73	20	46.0	1.38	1.4
Santuck	71	17	44.0	1.73	0.2
Seivern	74	15	43.6	2.43	
Smiths Mills				6.05	
Societyhill	70	20	42.2	2.43	0.5
Spartanburg	69	18	42.9	1.00	T.
Statesburg	73	20	47.8	2.41	
Summerville	76	25	49.2	3.00	
Sumter	75	21	48.2	3.10	
Trenton	69	22	46.8	1.78	
Trial	73	24	48.0	3.79	
Walhalla	69	15	44.7	1.56	
Walterboro	76	24	49.6	3.26	
Winnsboro	70	24	47.0	1.48	
Winthrop College	70	17	44.3	1.40	T.
Yemassee	75	26	47.6	3.07	
Yorkville	75	19	45.6	1.71	
South Dakota.					
Aberdeen	52	−30	16.0	0.47	1.2
Academy	66	−16	24.5	0.70	6.0
Alexandria	68	−31	22.2	0.63	6.0
Armour	73	−25	23.1	0.28	2.8
Ashcroft	55	−8	26.6	0.20	2.0
Bowdle	48	−31	15.5	0.15	1.5
Brookings	61	−28	19.4	0.02	0.2
Canton	60	−33	21.8	0.18	5.0
Castlewood	55	−22	18.4	0.08	3.8
Centerville	61	−26	22.8	0.75	7.1
Chamberlain	68	−20	24.8	0.11	1.5
Cherry Creek	67	−15	24.8	T.	T.
Clark	49	−23	16.4	0.18	1.0
Clear Lake	54	−22	14.4	0.02	0.2
Desmet	58	−26	19.5	0.30	3.0
Doland	53	−26	19.0	0.10	1.5
Elkpoint	64	−23	25.5	1.01	12.5
Fairfax	60	−18	24.0	0.07	1.0
Farmingdale				0.32	0.8
Faulkton	53	−32	16.8	0.19	3.0
Flandreau	59	−25	19.2	0.14	1.0
Forestburg	59	−31	20.7	0.45	4.5
Fort Meade	65	−16	25.7	1.42	14.2
Gannvalley	62	−25	22.4	0.20	2.0
Grand River School	52			0.20	2.0
Greenwood	71	−12	27.4	0.30	3.0
Hermosa	68	−7	28.2	0.24	3.0
Highmore	58	−31	20.5	0.40	4.0
Hotch City	70	−21	24.0	0.10	0.8
Howell	54	−31	16.9	0.17	1.7
Howard	62	−26	21.7	0.21	3.5
Ipswich	46	−37	13.0	0.05	T.
Kidder	49	−29	15.6	0.01	T.
Kimball	65	−20	22.2	0.14	4.0
Leola	42	−33	13.2		
Marion	65	−25	21.0[d]	0.27	5.0
Mellette	56	−32	17.0		
Menno	69	−24	23.5	0.27	3.3
Mil'bank	58	−26	16.2	0.07	1.5
Mitchell	65	−30	21.9	0.33	6.0
Mound City	49	−35	13.4	0.10	1.0
Oakdale	52	−19	17.9	0.20	2.0
Oelrichs	65	−14	26.8	1.70	7.0
Pine Ridge	69	−7	28.2	0.40	2.0
Ramsey	64	−33	20.6	0.30	3.0
Redfield	54	−31	15.0	0.19	3.0
Rosebud Agency	69	−10	27.6	0.29	3.8
Sioux Falls	62	−24	22.1	0.38	4.5
Spearfish	61	−9	30.4	1.70	10.0
Stephan	63	−30	21.1	0.24	2.0
Tyndall	69	−15	26.0	0.24	2.4
Vermillion	62	−16	24.4	1.00	10.0
Watertown	54	−19	16.1	0.30	1.5
Wentworth	65	−25	20.2	0.11	1.1
Whitehorse	59	−35	18.6	0.20	2.0
Woolsey				0.23	2.1
Tennessee.					
Andersonville	70	10	41.8	2.90	
Ashwood	69	10	38.3	0.69	T.
Benton	70	12	41.0	0.65	T.
Bluff City				1.13	
Bolivar	70	11	37.8	0.71	T.
Bristol	68	9	37.1	1.00	T.
Brownsville	69	9	38.2	0.60	T.
Byrdstown	73	12	40.8	1.99	2.1
Carthage	71	10	39.8	1.27	0.5
Catlettsburg				1.15	
Cedar Hill	70	3	37.4	1.20	1.0
Charleston				0.93	

TABLE II.—*Climatological record of cooperative observers*—Continued.

Stations.	Temperature. (Fahrenheit.)			Precipitation.	
	Maximum.	Minimum.	Mean.	Rain and melted snow.	Total depth of snow.
Tennessee—Cont'd.	°	°	°	*Ins.*	*Ins.*
Clarksville	70	6	37.5	1.17	2.7
Clinton	.....	.....	.....	2.30	
Covington	68	11	39.3	1.42	1.0
Dandridge	.....	.....	.....	1.46	
Decatur	68	11	40.0	1.88	
Dickson	70	7	37.8	1.30	0.5
Dover	74	5	37.4	1.05	2.5
Dyersburg	70	7	36.8	1.62	1.5
Elizabethton	72	10	39.4	0.48	T.
Erasmus	67	4	35.3	1.57	0.2
Florence	67	11	38.6	1.01	T.
Franklin	66	11	37.8	0.93	0.2
Greeneville	69	12	39.4	1.46	T.
Halls Hill	.....	.....	.....	1.37	T.
Hohenwald	69	5	38.1	1.18	0.1
Iron City	68	11	39.7	1.21	T.
Jackson	72	10	41.4	1.07	1.0
Johnsonville	72	8	38.9	0.95	1.0
Jonesboro	73	9	39.4	0.62	.....
Kenton	71	4	39.0	1.39	1.9
Kingston	.....	.....	.....	2.23	T.
Lafayette	67	4	38.4	1.83	1.0
Leadvale	.....	.....	.....	0.87	
Lewisburg	71	13	39.4	1.18	T.
Loudon	.....	.....	.....	1.00	
Lynnville	66	12	37.2	1.27	T.
McGee	.....	.....	.....	1.00	
McMinnville	72	14	39.7	1.04	0.4
Maryville	71	12	41.0	1.26	T
Monterey	68	9	38.8	1.27	1.0
Newport	68	11	39.2	1.25	.....
Palmetto	68	11	39.2	0.87	T.
Pope	71	10	40.3	1.05	T.
Rogersville	72	11	39.7	0.95	
Rugby	68	2	35.6	2.10	0.5
Savannah	69	12	39.6	1.50	
Sevierville	71	11	40.6	1.01	T.
Sewanee	64	14	38.8	0.60	T.
Silver Lake	64	4	35.4	1.20	2.4
Sparta	70	15	39.7	1.32	T.
Springdale	76	6	37.5	1.60	T.
Springville	71	5	37.8	1.14	2.5
Tazewell	.....	.....	.....	1.82	T.
Tellico Plains	71	12	40.4	1.04	T.
Tracy City	65	11	37.6	2.00	
Trenton	73	5	38.4	1.46	1.0
Tullahoma	68	15	39.2	1.77	0.2
Union City	71	0	37.4	1.49	3.5
Walling	.....	.....	.....	0.85	T.
Waynesboro	69	11	38.8	1.35	T.
Wildersville	68	10	39.4	0.76	1.6
Yukon	68	14	41.6	1.33	.....
Texas.					
Albany	82	13	46.2	0.90	.....
Alvin	.....	.....	.....	2.77	
Arthur	.....	.....	.....	0.47	1.0
Austin	73	26	52.1	1.29	0.5
Ballinger	90	18	49.0	0.45	T.
Beeville	82	28	54.0	2.40	.....
Big Spring	81	16	49.0	0.81	.....
Blanco	75	20	45.4	1.07	.....
Boerne	70	20	46.9	0.90	.....
Booth	.....	.....	.....	2.14	
Bowie	79	11	46.6	2.02	
Brazoria	.....	.....	.....	4.66	
Brenham	77	25	51.5	2.95	T
Brighton	77	27	56.6	3.22	.....
Brownwood	80	17	48.8	0.70	T.
Channing	76	6	39.8	0.56	.....
Childress	77	6	42.7	0.80	
Clarksville	72	17	44.4	5.31	.....
Claude	70	5	37.4	0.02	.....
Claytonville	76	14	50.2	0.90	0.2
College	79	28	54.6	1.79	.....
Coleman	80	16	51.0	0.90	
Colorado	81	13	47.8	0.73	T.
Columbia	80	27	53.3	2.91	
Columbus	.....	.....	.....	1.30	
Corsicana	79	19	50.8	2.61	.....
Crockett	77	25	51.8	2.40	0.1
Cuero	68	28	48.4	1.45	.....
Dallas	79	15	46.0	.....	.....
Dalhart	79	8	45.7	0.77	0.7
Dialville	73	.....	.....	2.55	0.6
Denison	.....	.....	.....	2.89	T.
Duval	76	23	51.6	1.56	T.
Eagle Pass	85	27	54.6	0.92	.....
Fort Brown	85	32	60.6	2.29	
Fort Clark	81	28	53.2	1.55	.....
Fort Davis	76	18	43.9	0.91	T.
Fort McIntosh	85	32	59.9	1.65	
Fort Ringgold	91	31	63.8	1.30	3.0
Fort Stockton	80	21	47.4	0.25	
Fredericksburg	78	21	49.0	0.75	.....
Gainesville	75[e]	14[e]	44.4[e]	2.97	T.
Georgetown	78	22	50.6	1.64	
Gonzales	.....	.....	.....	2.68	
Graham	85	13	48.0	0.69	

Stations.	Temperature. (Fahrenheit.)			Precipitation.	
	Maximum.	Minimum.	Mean.	Rain and melted snow.	Total depth of snow.
Texas—Cont'd.	°	°	°	*Ins.*	*Ins.*
Grapevine	82	16	48.2	2.83	0.2
Greenville	74	16	46.5	2.40	
Hale Center	68	11	39.2	0.15	
Hallettsville	78	28	54.2	1.58	
Haskell	84	10	45.2	0.79	0.8
Hearne	77	23	49.4	4.22	.....
Hempstead	.....	.....	.....	2.04	
Henrietta	81	13	44.5	0.33	
Hewitt	.....	.....	.....	2.03	T.
Hillsboro	77	19	48.8	2.82	3.0
Hondo	79	29	53.5	1.27	
Huntsville	82	20	49.0	2.53	.....
Jefferson	71	19	48.2	2.59	
Junction	.....	.....	.....	0.42	T.
Kaufman	75	19	49.5	2.63	T.
Kent	74	16	46.2	1.10	1.0
Kerrville	86	27	53.9	1.85	
Knickerbocker	80	18	49.0	0.57	1.5
Kopperl	.....	.....	.....	1.94	
Lampasas	79	19	47.4	1.04	.....
La Para	.....	.....	.....	4.12	3.0
Laureles Ranch	.....	.....	.....	3.83	
Liberty	82	25	52.6	2.50	
Llano	80	22	50.8	0.06	
Longlake	.....	.....	.....	2.54	
Longview	72	23	46.0	2.28	T.
Luling	76	26	51.9	4.18	
Mann	79[d]	.....	51.5[e]	2.52	
Marlin	79	20	49.5	2.67	.....
Mexia	76	20	47.6	2.45	1.0
Miami	74	10	42.0	0.55	.....
Mount Blanco	77	7	40.4	0.90	1.0
Mount Pleasant	78	19	48.0	2.30	.....
Nacogdoches	75	20	48.2	1.73	
New Braunfels	74	26	50.2	1.31	.....
Paris	73	20	45.4	2.69	
Port Lavaca	81	28	54.2	3.23	.....
Quanah	82	9	46.0	0.95	.....
Rhineland	84	10	43.6	1.50	.....
Riverside	.....	.....	.....	1.80	
Rock Island	80	27	53.6	1.61	
Rockland	.....	.....	.....	1.80	
Rockport	70	30	54.0	1.80	
Sabinal	.....	.....	.....	1.24	
San Marcos	75	25	50.8	1.81	
San Saba	80	16	49.6	1.11	.....
Santa Gertrude	.....	.....	.....	5.02	.....
Seymour	88	12	44.1	0.42	0.5
Sherman	74	15	46.7	3.21	T.
Sonora	78	16	45.3	0.63	.....
Sugarland	79	28	53.4	2.52	.....
Sulphur Springs	78	18	47.0	3.42	
Temple	78	16	48.2	2.36	.....
Texline	73	7	37.6	0.20	2.0
Tilden	84	22	55.6	0.71	.....
Tyler	73	22	44.4	2.30	
Valley Junction	.....	.....	.....	3.56	
Waco	80	20	50.8	2.05	1.1
Waxahachie	78	12	46.8	2.32	T.
Weatherford	77	13	45.8	1.46	1.5
Wichita Falls	.....	.....	.....	0.75	.....
Willspoint	75	18	46.8	3.29	T.
Utah.					
Alpine	.....	.....	.....	1.16	
Aneth	67	20	41.6	T.	T.
Beaver	63	12	35.4	1.09	
Castledale	53	0	29.1	T.	
Castle Rock	.....	.....	.....	1.13	15.0
Cedar City	60	8	37.4	1.28	8.2
Clear Creek	.....	.....	.....	1.30	13.0
Corinne	52	8	29.7	0.70	7.0
Coyoto	59	0	30.1	0.10	1.0
Deseret	68	16	34.8	0.41	2.0
Emery	52	18	35.0	0.20	2.0
Experiment Farm	76	21	47.0	.....	.....
Farmington	55	21	34.6	2.56	20.0
Fillmore	71	20	37.2	1.16	.....
Fort Duchesne	45	−15	18.7	0.30	3.0
Frisco	59	14	36.2	0.56	.....
Garrison	64	14	35.4	T.	
Giles	66	19	41.1	0.20	
Government Creek	56	14	32.0	0.95	9.0
Grayson	71	19	40.4	T.	T.
Green River	63	14	36.8	0.00	
Heber	50	2	28.4	1.58	11.0
Henefer	51	−4	28.4	1.96	10.0
Hite	69	25	46.4	0.22	
Huntsville	.....	.....	.....	1.82	8.0
Ibapah	61	10	30.6	0.90	9.0
Indianola	.....	.....	.....	0.11	.....
Kanab	66[f]	13[f]	38.6[f]	T.	T.
Kelton	.....	.....	.....	0.36	2.0
Levan	59	14	32.4	1.37	8.1
Loa	45	−5	22.2	0.15	
Logan	55	5	28.6	2.02	
Manti	70	15	32.8	0.61	.....
Marion	.....	.....	.....	2.27	20.5
Marysvale	69	7	33.8	0.63	4.3

Stations.	Temperature. (Fahrenheit.)			Precipitation.	
	Maximum.	Minimum.	Mean.	Rain and melted snow.	Total depth of snow.
Utah—Cont'd.	°	°	°	*Ins.*	*Ins.*
Meadowville	45	−4	22.3	1.10	8.0
Millville	.....	.....	.....	1.05	
Moab	67	20	41.0	0.21	T.
Morgan	53	−4	28.6	1.65	7.0
Mount Nebo	60	20	33.0	0.59	1.0
Mount Pleasant	54	8	31.2	1.50	9.0
Nephi	.....	.....	.....	1.07	6.0
Oak City	64	18	35.5	0.91	5.0
Ogden	52	10	31.3	2.41	5.8
Panquitch	.....	.....	.....	0.16	.....
Parowan	60	9	34.2	0.93	6.9
Payson	.....	.....	.....	1.89	16.0
Pinto	56	1	31.8	1.52	9.5
Plateau	49	−3	27.9	0.51	5.6
Provo	58	24	34.5	0.90	7.0
Ranch	55	−1	30.7	1.65	.....
Randolph	.....	.....	.....	0.30	5.5
Richfield	69	19	36.8	0.29	.....
Rockville	84	24	52.0	0.70	
St. George	78	23	48.6	0.71	
Salt Air	58	22	33.3	0.57	1.8
Scipio	63	17	35.5	1.08	2.0
Snowville	49	−8	25.2	0.40	.....
Soldier Summit	42	3	24.0	1.65	13.0
Sunnyside	.....	.....	.....	0.40	4.0
Thistle	60	10	33.2	1.50	14.0
Tooele	59	19	33.0	1.57	.....
Tropic	59	17	37.2	0.70	7.0
Trout Creek	60	17	33.8	0.43	4.5
Utah Lake	52	21	32.3	0.54	1.5
Vernal	43	−4	20.6	0.29	1.5
Vermont.					
Burlington	48	−10	23.2	2.02	18.0
Cavendish	55[d]	−16[d]	22.6[d]	1.36	16.7
Chelsea	49	−20	17.0	2.67	27.0
Cornwall	49	−13	21.4	2.31	30.2
Enosburg Falls	56	−36	16.4	2.11	13.5
Jacksonville	50	−18	18.6	2.77	19.0
Manchester	52	−12	20.0	2.17	6.5
Norwich	48	−22	17.8	2.73	24.0
St. Johnsbury	49	−22	17.8	2.51	23.0
Wells	46	−14	17.8	2.74	22.5
Westfield	.....	.....	.....	2.71	17.7
Woodstock	54	−20	18.2	2.29	22.0
Virginia.					
Alexandria	65	8	35.6	.....	.....
Arvonia	73	5	37.9	1.61	8.8
Ashland	65	10	36.5	1.83	6.2
Barboursville	68	9	38.6	1.23	8.5
Bigstone Gap	69	8	37.9	1.55	1.0
Blacksburg	68	5	33.5	0.82	3.5
Buchanan	.....	.....	.....	0.57	0.4
Burkes Garden	63	−2	31.8	1.02	2.0
Callaville	71	13	39.1	3.22	1.0
Charlottesville	69	7	37.8	1.04	6.0
Clarksville	.....	.....	.....	3.12	1.0
Columbia	68	10	38.2	1.26	8.0
Dale Enterprise	66	3	34.2	1.01	6.0
Danville	.....	.....	.....	1.56	1.5
Dinwiddie	71	7	38.3	3.62	5.5
Elk Knob	65	7	36.8	1.22	1.0
Farmville	66	10	35.4	0.85	7.0
Fredericksburg	68	8	36.6	1.50	8.0
Grahams Forge	65	4	35.1	0.51	T.
Hampton	66	14	40.0	5.15	1.5
Hot Springs	61	0	31.8	0.32	1.5
Ivanhoe	.....	.....	.....	0.69	0.4
Lexington	68	4	35.2	1.09	5.2
Lincoln	64	2	31.8	1.57	8.0
Marion	69	3	36.8	0.56	1.7
Mendota	.....	.....	.....	1.03	0.5
Newport News	66	14	39.9	5.08	3.5
Nokesville (near)	66	7	35.2	1.16	6.0
Petersburg	72	5	36.7	1.60	4.0
Quantico	64	8	35.4	1.52	5.5
Radford	.....	.....	.....	0.38	4.0
Randolph	.....	.....	.....	0.59	2.0
Riverton	.....	.....	.....	1.00	12.0
Roanoke	71[f]	9[f]	36.2[f]	.....	4.5
Shenandoah	.....	.....	.....	0.80	8.0
Skyland	.....	.....	.....	0.96	13.2
Speers Ferry	.....	.....	.....	1.36	.....
Spottsville	70	13	39.3	5.62	2.0
Staunton	70	5	37.4	0.94	5.8
Stephens City	65	2	33.9	1.32	8.0
Warsaw	69	8	36.8[g]	3.65	3.0
Williamsburg	68	12	38.7	5.45	7.0
Woodstock	70	3	35.2	0.90	7.5
Washington.					
Aberdeen	64	27	44.5	8.46	
Anacortes	59	32	42.6	1.71	
Ashford	.....	.....	.....	6.45	.....
Baker	59	27	42.2	7.45	
Bellingham	60	27	44.8	1.99	
Blaine	56	28	42.0	3.67	
Brinnon	54	29	41.3	9.87	
Cedonia	47	16	33.2	3.19	3.5
Centralia	60	23	42.5	3.89	

TABLE II.—*Climatological record of cooperative observers*—Continued. *Late reports for January, 1906.*

Stations.	Temperature. (Fahrenheit.) Maximum.	Minimum.	Mean.	Precipitation. Rain and melted snow.	Total depth of snow.
Washington—Cont'd.	°	°	°	*Ins.*	*Ins.*
Cheney	50	5	33.4	1.99	
Clearbrook	54	24	41.2	5.18	
Clearwater	52	28	41.6	10.36	
Cle Elum	49	11	33.6	1.98	
Colville	49	10	32.5	2.58	0.1
Conconully	45	11	30.2	1.17	5.1
Coupeville	57	31	44.7	0.71	
Crescent	46	12	32.4	2.43	7.0
Cusick	45	0	29.2	2.92	2.0
Danville	49	11	32.0	1.43	3.0
Dayton	61	23	38.2	1.70	
Easton	.....	.....	.....	3.78	11.0
East Sound	.....	.....	.....	2.84	
Ellensburg	59	17	35.2	1.20	
Ephrata	54	22	35.3	1.10	T.
Fort Simcoe	52	27	37.8	2.07	.....
Goldendale	55	10	36.5	2.35	6.8
Grandmound	68	21	42.0	4.79	
Granite Falls	.....	.....	.....	5.03	
Hatton	60	22	38.1	1.24	
Horse Heaven	.....	.....	.....	0.90	.....
Ilwaco	69	31	47.1	9.91	
Kennewick	67	23	39.9	1.00	
Kiona	62	21	41.8	1.05	
Kosmos	68	26	44.6	5.02	
Lacenter	60	24	42.0	6.66	
Lakeside	52	21	35.0	1.95	3.0
Lester	54	26	40.3	3.05	T.
Lind	57	24	35.9	1.79	2.5
Loomis	52	20	36.6	0.79	
Merritt	.....	.....	.....	4.03	16.0
Mottinger Ranch	68	25	42.0	1.12	
Mount Pleasant	55	30	41.8	7.18	
Moxee	61	19	37.7	0.90	
Northport	44	7	30.1	2.56	6.0
Odessa	57	21	35.5	1.68	T.
Olga	55	31	43.6	3.10	
Olympia	56	25	41.9	5.16	
Pinehill	54	23	39.6	3.29	0.3
Pomeroy	60	18	37.4	1.24	0.2
Port Townsend	55	32	44.1	0.95	
Quinisult	56	28	42.1	.....	
Rattlesnake	51*	20*	30.8*	1.66	4.3
Republic	45	5	30.4	1.51	3.0
Ritzville	.....	.....	.....	1.95	1.5
Rock Lake	.....	.....	.....	2.07	0.8
Rosalia	48	20	35.1	2.29	T.
Sedro	54	26	42.0	2.91	
Snohomish	55	26	43.0	4.79	
Snoqualmie	59	26	42.6	4.87	
Southbend	63	29	46.0	7.90	
Stehekin	50	18	35.4	1.31	
Sunnyside	60	21	38.2	0.99	
Tekoa	.....	.....	.....	1.85	
Touchet	65	20	40.4	0.97	
Trinidad	56	23	37.6	1.36	T.
Twisp	49	4	29.0	1.26	8.0
Union	55	26	42.3	11.74	T.
Vancouver	63	24	43.4	5.90	
Vashon	57	32	43.2	5.56	
Wahluke	61	22	39.0	1.90	
Waterville	47	8	27.6	1.15	7.0
Wenatchee (near)	52	12	32.1	0.59	
Wilbur	50	14	32.2	2.59	.....
Winthrop	50	1	27.8	0.96	.....
Zindel	60	21	40.9	0.58	
West Virginia.					
Bancroft	73	1	34.5	2.40	14.0
Bayard	64	−10	26.4	2.37	18.8
Beckley	70	− 2	32.4	1.25	3.0
Bens Run	71	− 1	32.0	2.10	9.0
Berkley Springs	63	4	33.2	1.80	4.7
Buckhannon	68	− 1	31.8	3.31	10.0
Burlington	64	0	30.4	1.00	9.0
Cairo	74	0	32.8	2.32	8.0
Central	72	− 9	30.6	1.40	6.5
Charleston	71	10	36.9	1.65	9.2
Creston	72	− 7	32.1	2.73	17.2
Cuba	72	−10	31.8	1.73	5.0
Doane[1]	73	3	38.4	.....	.....
Durbin	64	− 5	28.0	0.46	3.5
Elkhorn	70	5	37.0	0.54	2.0
Glenville	73	− 1	33.3	2.68	18.0
Grafton	72	− 4	32.4	1.61	6.0
Harpers Ferry	.....	.....	.....	1.58	12.2
Hinton	68	8	36.1*	1.00	1.2
Huntington	69	1	31.5	1.72	10.7
Lewisburg	69	3	34.7	1.21	7.0
Logan	74	− 9	39.0	1.50	5.0
Lost City	60	0	29.2	0.55	5.5
Lost Creek	74	− 4	31.8	2.33	9.0
Madison	73	− 2	32.2	1.93	10.5
Marlinton	63	− 1	30.5	1.07	1.0
Martinsburg	60	4	30.6	1.20	5.0
Moorefield	70	− 1	33.2	1.00	7.5
Mooresville	.....	.....	.....	0.89	.....
Morgantown	71	− 6	31.6	1.58	7.0
Moundsville	72	− 3	31.4	1.40	5.4
West Virginia—Cont'd.					
New Cumberland	65	− 8	26.2	0.75	6.0
New Martinsville	74	0	33.2	1.52	5.0
Nuttallburg	60	2	24.0	1.00	3.0
Parsons	76	0	31.3	2.55	18.0
Philippi	72	− 6	32.0	1.88	11.2
Pickens	67	−11	29.3	1.57	12.0
Point Pleasant	71	1	35.0	2.25	11.0
Powellton	76	4	35.4	2.09	11.0
Princeton	61	− 1	29.4	1.75	10.5
Romney	65	4	34.6	1.16	8.0
Rowlesburg	.....	.....	.....	1.38	7.6
Ryan	75	− 8	33.0	2.20	11.6
Smithfield	71	− 5	31.0	1.60	5.0
Southside	72	− 6	33.0	2.34	16.0
Spencer	73	−11	29.6	2.54	16.6
Sutton	79	4	31.4	1.55	15.0
Terra Alta	70	−11	29.4	1.05	7.0
Union	65	18	37.7	0.50	0.5
Uppertract	68	0	33.5	0.65	6.5
Valley Fork	77	− 6	34.0	2.33	9.7
Webster Springs	72	2	34.0	1.60	7.0
Wellsburg	64	− 7	27.8	1.13	6.0
Weston	.....	.....	.....	3.34	19.5
Wheeling	69	0	31.4	1.13	3.5
Williamson	77	9	35.6	0.97	1.5
Wisconsin.					
Amherst	47	−24	15.6	0.60	6.0
Antigo	45	−24	15.2	0.32	3.2
Appleton	41	−13	19.0	0.59	6.9
Appleton Marsh	47	−24	15.6	0.69	6.7
Ashland	.....	.....	.....	0.37	.....
Barron	48	−30	12.8	0.40	4.0
Beloit	47	− 5	21.4	1.08	3.4
Berlin	45	−13	16.8	0.70	7.0
Black River Falls	.....	.....	.....	0.63	7.0
Brodhead	49	−16	22.8	1.50	3.5
Burnett	46	−12	19.8	1.02	3.0
Butternut	50	−36	12.8	0.42	4.2
Chilton	45	−10	20.1	1.51	11.7
Chippewa Falls	.....	.....	.....	0.10	2.0
City Point	48	−16	18.6	0.40	4.0
Eau Claire	47	−21	15.7	0.32	3.2
Florence	49	−26	12.8	0.60	6.0
Fond du Lac	45	−17	19.0	0.98	7.0
Grand Rapids	45	−28	15.2	0.37	4.5
Grand River Locks	.....	.....	.....	1.40	15.0
Grantsburg	46	−35	12.0	0.80	8.0
Hancock	42	−22	15.8	0.60	6.0
Harvey	45	−11	20.6	1.85	7.9
Hayward	46	−39	9.6	0.27	2.7
Hillsboro	49	−32	16.6	0.80	8.5
Koepenick	50	−32	14.2	0.90	9.0
Lancaster	50	−10	21.8	1.35	13.5
Manitowoc	45	− 7	21.2	1.47	11.4
Mauston	46	−25	19.0	1.60	13.0
Meadow Valley	44	−28	13.9	0.48	6.0
Medford	48	−26	14.8	0.20	2.0
Menasha	.....	.....	.....	0.50	9.5
Merrill	48	−30	14.0	0.53	9.0
Minocqua	47	−28	12.0	0.40	4.0
Mount Horeb	46	−10	20.8	0.95	5.0
Neillsville	46	−34	13.0	1.10	28.0
New London	42	−22	17.5	0.59	2.0
New Richmond	45	−25	16.2	0.60	6.0
Oconto	46	−14	18.4	1.10	11.0
Osceola	46	−30	13.8	0.18	3.0
Oshkosh	44	−11	20.1	0.69	5.0
Pine River	44	−17	17.0	0.63	6.5
Portage	45	−23	19.0	0.77	8.0
Port Washington	43	− 4	21.1	2.09	10.9
Prentice	45	−41	11.9	0.30	2.6
Racine	47	− 1	24.0	1.94	.....
Sheboygan	44	− 5	22.7	1.49	11.5
Shullsburg	50	−12	21.2	2.18	9.8
Spooner	46	−35	11.6	0.09	2.0
Stanley	43	−29	13.8	0.60	6.0
Stevens Point	43	−32	13.8	0.09	.....
Sturgeon Bay	58	−15	19.4	0.82	11.3
Valley Junction	43	−28	14.0	0.65	6.5
Viroqua	52	−15	18.7	0.96	7.0
Watertown	45	−13	19.3	1.46	10.2
Waukesha	.....	.....	.....	1.23	5.7
Waupaca	41	−20	15.4	0.50	6.5
Wausau	44	−23	15.9	0.51	8.0
Whitehall	48	−36	14.0	0.90	9.0
Wyoming.					
Afton	51	−16	21.4	0.91	7.0
Alcova	56	− 8	31.7	0.11	2.5
Barnum	.....	.....	.....	0.48	5.6
Barrett Creek Cabin	58*	− 8*	23.0*	1.05	11.0
Basin	55	−23	18.4	0.57	.....
Bedford	45	−17	21.9	1.26	12.6
Border	44	−25	14.0	0.69	.....
Buffalo	61	−15	27.1	0.26	2.6
Cambria	58	−10	28.6	0.55	5.5
Chugwater	65	−14	31.4	0.45	4.5
Clark	.....	.....	.....	0.41	5.0
Cody	65	−15	30.4	0.30	3.0
Wyoming—Cont'd.					
Daniel	45	−23	14.0	0.45	4.5
Devil's Gate Creek Cabin	47	−17	17.7	0.90	9.0
Elk Mountain	.....	.....	.....	0.55	6.6
Embar	51	− 5	26.4	0.10	1.0
Evanston	48	− 5	20.0	1.02	7.5
Experiment Farm	.....	.....	.....	T	T.
Fayette	45	−22	16.4	0.30	3.0
Fort Laramie	65	− 6	28.1	0.30	4.4
Fort Washakie	55[1]	− 1	29.8[2]	0.40	10.5
Gillette	55	−11	28.6	0.85	12.8
Granite Canyon	53	− 7	27.8	0.32	3.6
Granite Springs	.....	.....	.....	0.27	2.7
Green River	49	−12	22.4	0.04	0.4
Griggs	61	−18	28.8	0.90	9.0
Hatton	.....	.....	.....	0.45	4.5
Hyattville	60	− 5	30.2	.....	.....
Iron Mountain	60	−18	27.8	0.07	1.2
Jackson	42	−33	15.2	3.40	28.0
Kirtley	58	−10	27.7	0.31	2.8
Laramie	54	− 4	27.5	0.05	0.5
Leo	47	−14	25.5	0.34	4.5
Little Medicine	45	−15	19.0	1.08	14.5
Lolabama Ranch	.....	.....	.....	0.44	3.0
Lusk	62	−17	26.4	0.42	4.2
Moorecroft	58	−20	26.4	0.60	6.0
Moore	65	−15	31.6	0.09	2.1
Pathfinder	54	−12	29.1	0.15	3.4
Phillips	67	−14	33.5	T.	T.
Pine Bluff	65	−12	32.3	0.20	2.0
Pinedale	45	−18	16.0	0.03	0.3
Saratoga	53	0	28.0	0.03	1.2
South Pass City	46	−13	18.0	1.30	13.0
Thayne	55	−20	21.0	1.32	11.0
Thermopolis	45	− 7	24.9	.....	.....
Wells	39	−15	16.8	0.84	7.0
Wheatland	72	−10	34.1	0.03	0.5
Wolf	62	−16	31.2	2.25	22.5
Yellowstone Pk. (Fount)	50	−12	20.3[3]	2.10	21.0
Yellowstone Pk. (G. Can.)	40	−21	18.6	.....	.....
Yellowstone Pk. (Lake)	40	−26	16.2	2.83	25.0
Yellowstone Pk. (Norris)	35	−25	14.8	1.40	.....
Yellowstone Pk (Riv'side)	44	−20	21.1	1.86	22.0
Yellowstone Pk (Snake R)	53	−25	20.0	2.50	25.0
Yellowstone Pk. (Soda B.)	45	−18	20.6	1.63	14.3
Yellowstone Pk. (Up. B.)	53	−20	20.6	3.71	26.2
Porto Rico.					
Adjuntas	39	45	68.4	0.19	
Aguirre	98	63	76.8	1.86	
Albonito	80	43	67.3	3.85	
Anasco	92	60	75.6	0.22	
Arecibo	90	53	71.6	0.87	
Barros	83	50	67.8	1.62	
Bayamon	92	54	73.0	1.37	
Caguas	89	52	71.8	1.27	
Canovanas	89	65	76.5	1.92	
Cayey	86	66	76.6	1.84	
Cidra	87	55	71.4	0.15	
Coloso	91	68	79.2	0.58	
Carozal	92	54	76.7	1.55	
Fajardo	88	60	75.6	2.00	
Guanica	88	53	72.4	0.05	
Hacienda Josefa	.....	.....	.....	2.21	
Humacao	84	68	76.5	4.10	
Isabela	87	68	77.9	0.57	
Juana Diaz	90	62	77.5	1.01	
La Carmelita	84	59	71.3	3.28	
La Isolina	91	57	71.4	1.23	
Lares	93	54	72.2	0.89	
Las Cruces	86	56	69.4	2.07	
Las Marias	86	58	72.4	0.82	
Manati	94	58	74.7	1.23	
Maunabo	89	62	76.4	3.76	
Mayaguez	92	59	75.0	1.57	
Morovis	89	54	71.2	1.30	
Ponce	86	61	74.1	1.13	
Rio Blanco	87	57	74.3	5.56	
Rio Piedras	.....	.....	.....	3.18	
San German	91	59	75.6	0.84	
San Lorenzo	91	54	72.8	1.89	
San Salvador	86	56	70.4	0.50	
Santa Isabel	87	59	74.2	0.82	
Vieques	89	65	76.8	2.49	
Yauco	88	51	73.2	0.15	
New Brunswick.					
St. John	43	− 5	22.4	3.59	11.5
West Indies.					
Basseterre, St. Kitts	84	66	76.0	1.67	
Hamilton, Ber	71	52	63.6	.....	

Late reports for January, 1906.

Alabama.	°	°	°	*Ins.*	*Ins.*
Camp Hill	69	23	45.2	5.50	4.0
Alaska.					
Coal Harbor	41	1	21.3	2.33	5.8
Fairbanks	13	−65	−36.6	1.71	17.1

TABLE II.—*Climatological record of cooperative observers. Late reports for January, 1906*—Continued.

Stations.	Temperature. (Fahrenheit.)			Precipitation.	
	Maximum.	Minimum.	Mean.	Rain and melted snow.	Total depth of snow.
Alaska—Cont'd.	°	°	°	*Ins.*	*Ins.*
Fort Egbert	.....	.....	.....	0.56	6.1
Kenai	33	—42	- 4.0	0.30	5.5
Ketchemstock	.....	.....	.....	0.36	4.0
North Fork	.....	.....	.....	0.70	7.0
Rampart	5	—66	-36.8	0.63	7.2
Summit	21	—49	-18.6	1.19	11.9
Sunrise	41	- 29	- 0.8	2.18	30.7
Udakta	46	10	26.6	3.09	.....
Arizona.					
Vail [6]	81	45	60.6	1.00	
California.					
Imperial	96	24	53.8	T.	
Idaho.					
Garnet	59	7	34.0	1.05	.....
Ola	65	—10	23.8	.....	
Payette	45	5	28.5	3.46	15.0
Pollock	53	16	36.3	2.01	6.0
Poplars	.....	.....	.....	2.41	.....
Roosevelt	50	— 4	23.8	3.46	44.1
Indiana.					
Farmland	70	— 2	34.8	1.60	2.0
Indian Territory.					
Pauls Valley	76	5	42.2	0.75	1.0
Iowa.					
Perry	50	—11	24.1	1.35	13.5
Louisiana.					
Liberty Hill	80	17	49.2	2.27	1.0
Maine.					
Patten	.....	.....	.....	3.50	15.0
Montana.					
Jordan	50	—31	21.2	0.40	4.0
Nebraska.					
Alliance	.....	.....	.....	0.15	3.0
Du Bois	.....	.....	.....	0.58	4.4
New Hampshire.	°	°	°	*Ins.*	*Ins.*
Nashua	64	4	30.2	2.35	8.5
New Jersey.					
Canton	.....	.....	.....	2.45	0.5
North Dakota.					
Balfour	36	—24	12.4	.....	.....
Medora	59[a]	—18[a]	20.2[a]	0.40	4.0
Palermo	43	—17	13.2	1.00	10.0
Ohio.					
Bangorville	70	2	34.4	1.77	4.5
Oklahoma.					
Cache	77	10	44.9[a]	1.23	3.7
Chandler	78	3	41.4	1.56	2.0
Oregon.					
Government Camp	57	9[1]	28.0[a]	6.19	44.1
Heppner	64	14	38.8	1.00	0.6
Weston	57	10	34.2	1.57	9.2
South Carolina.					
Heath Spring	76	20	44.9	5.50	1.0
Newberry	77	21	45.0	6.18	2.5
Society Hill	73	23	45.0	4.26	
Yorkville	73	26	45.7	7.78	2.5
Texas.					
College Station	80	25	54.6	0.95	.....
Mount Blanco	74	10	41.6	6.33	3.0
New Braunfels	78	21	50.5	0.39	.....
Sherman	74	15	43.4	1.54	.....
Waxahachie	77	14	45.0	1.60	5.5
Virginia.					
Callaville	76	20	46.2	4.02	
West Virginia.					
Smithfield	76	— 4	37.2	4.07	6.7
Union	67	12	40.4	4.92	2.0
Wisconsin.					
Stevens Point	49	—21	20.8	2.51	12.0
Porto Rico.					
La Carmelita	84	58	71.4	1.79	

EXPLANATION OF SIGNS.

[a] Extremes of temperature from observed readings of dry thermometer.

A numeral following the name of a station indicates the hours of observation from which the mean temperature was obtained, thus:

[1] Mean of 7 a. m. + 2 p. m. + 9 p. m. + 9 p. m. + 4.
[2] Mean of 8 a. m. + 8 p. m. + 2.
[3] Mean of 7 a. m. + 7 p. m. + 2.
[4] Mean of 6 a. m. + 6 p. m. + 2.
[5] Mean of 7 a. m. + 2 p. m. + 2.
[6] Mean of readings at various hours reduced to true daily mean by special tables.

The absence of a numeral indicates that the mean temperature has been obtained from daily readings of the maximum and minimum thermometers.

An italic letter following the name of a station, as "Livingston *a*," "Livingston *b*," indicates that two or more observers, as the case may be, are reporting from the same station. A small roman letter following the name of a station, or in figure columns, indicates the number of days missing from the record; for instance, "[a]" denotes 14 days missing.

No note is made of breaks in the continuity of temperature records when the same do not exceed two days. All known breaks of whatever duration, in the precipitation record receive appropriate notice.

CORRECTIONS.

January, 1906, Mississippi, Corinth, make precipitation 4.09 instead of 4.04.

NOTE.—The following changes have been made in names of stations: Idaho, Priest River changed to Newport; Nevada, Clover Valley changed to Wood.

TABLE III.—*Wind resultants, from observations at 8 a. m. and 8 p. m., daily, during the month of February, 1906.*

Stations.	Component direction from—				Resultant.	
	N.	S.	E.	W.	Direction from—	Duration.
New England.	*Hours.*	*Hours.*	*Hours.*	*Hours.*	°	*Hours.*
Eastport, Me	22	17	9	21	n. 67 w.	13
Portland, Me	25	15	4	23	n. 62 w.	22
Concord, N. H.†	15	6	5	10	n. 29 w.	10
Northfield, Vt	22	25	8	9	s. 18 w.	3
Boston, Mass	23	16	8	22	n. 63 w.	16
Nantucket, Mass	23	12	13	18	n. 24 w.	12
Block Island, R. I	24	13	12	20	n. 36 w.	14
Providence, R. I	24	10	11	27	n. 49 w.	21
Hartford, Conn	28	16	5	17	n. 45 w.	17
New Haven, Conn	29	12	11	18	n. 22 w.	18
Middle Atlantic States.						
Albany, N. Y	25	19	11	17	n. 45 w.	8
Binghamton, N. Y.†	8	3	13	8	n. 45 e.	7
New York, N. Y	25	12	10	22	n. 43 w.	18
Harrisburg, Pa	25	5	17	21	n. 11 w.	20
Philadelphia, Pa	28	14	11	17	n. 23 w.	15
Scranton, Pa	30	12	14	15	n. 3 w.	18
Atlantic City, N. J	28	11	10	22	n. 35 w.	21
Cape May, N. J	30	12	10	16	n. 18 w.	19
Baltimore, Md	32	9	10	19	n. 21 w.	25
Washington, D. C	31	8	12	19	n. 17 w.	24
Lynchburg, Va	22	16	18	19	n. 9 w.	6
Mount Weather, Va	24	15	10	26	n. 61 w.	18
Norfolk, Va	30	16	16	7	n. 33 e.	17
Richmond, Va	32	13	11	9	n. 6 e.	19
Wytheville, Va	15	5	15	27	n. 50 w.	16
South Atlantic States.						
Asheville, N. C	25	17	14	17	n. 21 w.	8
Charlotte, N. C	22	19	16	11	n. 59 e.	6
Hatteras, N. C	31	9	17	10	n. 18 e.	23
Raleigh, N. C	28	12	10	20	n. 32 w.	19
Wilmington, N. C	27	10	16	16	n.	17
Charleston, S. C	27	10	16	15	n. 3 e.	17
Columbia, S. C	26	12	18	12	n. 23 e.	15
Augusta, Ga	25	11	17	18	n. 4 w.	14
Savannah, Ga	27	11	18	15	n. 11 e.	16
Jacksonville, Fla	32	8	15	15	n.	24
Florida Peninsula.						
Jupiter, Fla	28	10	13	13	n.	18
Key West, Fla	34	4	25	6	n. 32 e.	36
Tampa, Fla	34	3	23	13	n. 18 e.	33
Eastern Gulf States.						
Atlanta, Ga	21	8	19	23	n. 17 w.	14
Macon, Ga.†	17	3	7	8	n. 4 w.	14
Thomasville, Ga†	19	2	8	6	n. 7 e.	17
Pensacola, Fla.†	18	0	11	4	n. 21 e.	19
Anniston, Ala	27	15	11	12	n. 5 w.	12
Birmingham, Ala.†	16	5	9	6	n. 15 e.	11
Mobile, Ala	36	14	9	4	n. 13 e.	23
Montgomery, Ala	23	10	15	15	n.	13
Meridian, Miss.†	17	6	5	2	n. 15 e.	11
Vicksburg, Miss	24	15	21	9	n. 53 e.	15
New Orleans, La	32	8	19	7	n. 27 e.	27
Western Gulf States.						
Shreveport, La	20	14	21	13	n. 53 e.	10
Fort Smith, Ark	13	12	27	12	n. 86 e.	15
Little Rock, Ark	22	19	13	13	n.	3
Corpus Christi, Tex	27	10	24	6	n. 47 e.	25
Fort Worth, Tex	19	17	21	12	n. 77 e.	9
Galveston, Tex	20	13	27	5	n. 72 e.	23
Palestine, Tex	21	19	20	8	n. 71 e.	12
San Antonio, Tex	25	10	23	9	n. 43 e.	20
Taylor, Tex.†	14	7	7	4	n. 23 e.	8
Ohio Valley and Tennessee.						
Chattanooga, Tenn	20	11	13	23	n. 48 w.	14
Knoxville, Tenn	26	13	10	21	n. 40 w.	17
Memphis, Tenn	27	18	18	7	n. 51 e.	14
Nashville, Tenn	32	8	7	13	n. 14 w.	25
Lexington, Ky.†	9	10	11	6	s. 79 e.	5
Louisville, Ky	28	18	9	17	n. 39 w.	13
Evansville, Ind.†	13	6	9	5	n. 30 e.	8
Indianapolis, Ind	22	20	12	14	n. 45 w.	3
Cincinnati, Ohio	22	15	20	16	n. 30 e.	8
Columbus, Ohio	21	19	15	14	n. 27 e.	2
Pittsburg, Pa	26	12	14	19	n. 20 w.	15
Parkersburg, W. Va	24	14	9	18	n. 42 w.	14
Elkins, W. Va	25	11	4	20	n. 49 w.	21
Lower Lake Region.						
Buffalo, N. Y	12	21	9	21	s. 53 w.	15
Oswego, N. Y	17	27	9	14	s. 27 w.	11
Rochester, N. Y	10	26	8	25	s. 47 w.	23
Syracuse, N. Y	11	25	11	20	s. 33 w.	17
Erie, Pa	14	22	6	24	s. 66 w.	20
Cleveland, Ohio	16	24	18	16	s. 14 e.	8
Sandusky, Ohio†	9	12	4	10	s. 63 w.	7
Toledo, Ohio	14	23	9	20	s. 51 w.	14
Detroit, Mich	17	23	8	20	s. 63 w.	13
Upper Lake Region.						
Alpena, Mich	22	17	4	26	n. 77 w.	23
Escanaba, Mich	25	21	5	21	n. 76 w.	16
Grand Haven, Mich	19	20	21	9	s. 85 e.	12
Grand Rapids, Mich	19	20	13	14	s. 45 w.	1
Houghton, Mich.†	10	2	12	10	n. 14 e.	8
Marquette, Mich	14	21	2	29	s. 75 w.	28
Port Huron, Mich	15	25	8	17	s. 42 w.	14
Sault Ste. Marie, Mich	19	18	15	19	n. 76 w.	4
Chicago, Ill	19	22	7	21	s. 78 w.	14
Milwaukee, Wis	21	17	5	26	n. 79 w.	21
Green Bay, Wis	21	25	5	16	s. 70 w.	12
Duluth, Minn	21	14	4	31	n. 75 w.	28
North Dakota.						
Moorhead, Minn	25	20	11	12	n. 11 w.	5
Bismarck, N. Dak	20	9	25	14	n. 45 e.	16
Devils Lake, N. Dak	15	20	11	19	s. 58 w.	9
Williston, N. Dak	20	18	18	16	n. 45 e.	3
Upper Mississippi Valley.						
Minneapolis, Minn.*	11	10	5	9	n. 76 w.	4
St. Paul, Minn	25	20	12	11	n. 11 e.	5
La Crosse, Wis.†	13	11	1	4	n. 56 w.	4
Madison, Wis	22	21	9	15	n. 80 w.	6
Charles City, Iowa	23	17	16	13	n. 27 e.	7
Davenport, Iowa	24	17	13	15	n. 16 w.	7
Des Moines, Iowa	23	18	12	15	n. 31 w.	6
Dubuque, Iowa	20	20	11	19	w.	8
Keokuk, Iowa	20	19	18	15	n. 72 e.	3
Cairo, Ill	25	18	13	6	n. 45 e.	10
La Salle, Ill.†	9	11	8	7	s. 27 e.	2
Peoria, Ill	23	18	15	9	n. 50 e.	
Springfield, Ill	21	19	13	13	n.	
Hannibal, Mo.†	12	5	7	10	n. 23 w.	8
St. Louis, Mo	21	20	18	7	n. 85 e.	11
Missouri Valley.						
Columbia, Mo.*	11	7	12	3	n. 66 e.	10
Kansas City, Mo	19	22	20	10	s. 73 e.	10
Springfield, Mo	17	20	19	9	s. 73 e.	10
Iola, Kans.†	7	11	7	6	s. 14 e.	4
Topeka, Kans.*	9	11	8	5	s. 56 e.	4
Lincoln, Nebr	16	27	13	8	s. 24 e.	12
Omaha, Nebr	22	24	10	9	s. 27 e.	2
Valentine, Nebr	25	14	9	20	n. 45 w.	16
Sioux City, Iowa †	9	11	8	5	s. 56 e.	4
Pierre, S. Dak	22	16	23	10	n. 65 e.	14
Huron, S. Dak	22	19	18	13	n. 59 e.	6
Yankton, S. Dak. †	9	7	8	9	n. 27 w.	2
Northern Slope.						
Havre, Mont	16	5	14	31	n. 57 w.	20
Miles City, Mont	19	21	14	15	s. 27 w.	2
Helena, Mont	17	17	3	32	w.	29
Kalispell, Mont	20	13	4	32	n. 76 w.	29
Rapid City, S. Dak	18	10	15	25	n. 51 w.	13
Cheyenne, Wyo	22	11	3	34	n. 70 w.	33
Lander, Wyo	19	14	24	15	n. 61 e.	10
Yellowstone Park, Wyo	10	37	4	20	s. 31 w.	31
North Platte, Nebr	14	19	19	18	s. 11 e.	5
Middle Slope.						
Denver, Colo	14	24	14	14	s.	10
Pueblo, Colo	18	12	21	19	n. 18 e.	6
Concordia, Kans	18	25	11	8	s. 23 e.	8
Dodge, Kans	18	21	18	10	s. 69 e.	8
Wichita, Kans						
Oklahoma, Okla	22	25	11	8	s. 45 e.	4
Southern Slope.						
Abilene, Tex	21	26	9	9	s.	5
Amarillo, Tex	14	30	11	15	s. 14 w.	16
Del Rio, Tex†	7	8	16	4	s. 85 e.	12
Roswell, N. Mex.	19	22	12	16	s. 53 w.	5
Southern Plateau.						
El Paso, Tex	19	7	23	22	n. 5 e.	12
Santa Fe, N. Mex	24	13	20	15	n. 24 e.	12
Flagstaff Ariz	15	13	17	22	n. 68 w.	5
Phoenix, Ariz	8	9	35	14	s. 87 e.	21
Yuma, Ariz	14	17	21	12	s. 72 e.	10
Independence, Cal	15	19	17	20	s. 37 w.	5
Middle Plateau.						
Reno, Nev	7	15	11	33	s. 71 w.	23
Winnemucca, Nev	26	13	25	12	n. 45 e.	18
Modena, Utah	6	12	22	26	s. 34 w.	7
Salt Lake City, Utah	21	16	16	18	n. 22 w.	5
Durango, Colo	23	15	1	32	n. 76 w.	32
Grand Junction, Colo	16	11	17	24	n. 54 w.	9
Northern Plateau.						
Baker City, Oreg	5	40	8	12	s. 7 w.	35
Boise, Idaho	12	16	23	16	s. 60 e.	8
Lewiston, Idaho†	2	6	20	3	s. 77 e.	18
Pocatello, Idaho	2	32	26	14	s. 22 e.	32
Spokane, Wash	18	20	15	16	s. 27 w.	2
Walla Walla, Wash	15	27	7	15	s. 34 w.	14
North Pacific Coast Region.						
North Head, Wash	10	17	30	10	s. 71 e.	21
Port Crescent, Wash.*	7	6	15	5	n. 84 e.	10
Seattle, Wash	18	23	17	9	s. 58 e.	9
Tacoma, Wash	23	21	9	14	n. 68 w.	5
Tatoosh Island, Wash	0	18	36	8	n. 57 e.	33
Portland, Oreg	5	21	33	10	s. 55 e.	28
Roseburg, Oreg	18	21	12	18	s. 63 w.	7
Middle Pacific Coast Region.						
Eureka, Cal	13	26	13	14	s. 4 w.	13
Mount Tamalpais, Cal	9	25	13	24	s. 34 w.	19
Red Bluff, Cal	21	25	9	11	s. 27 w.	4
Sacramento, Cal	14	24	25	3	s. 66 e.	24
San Francisco, Cal	14	17	12	25	s. 77 w.	13
San Jose, Cal. †	11	8	4	12	n. 69 w.	8
South Pacific Coast Region.						
Fresno, Cal	24	11	18	16	n. 9 e.	13
Los Angeles, Cal	13	14	22	19	s. 72 e.	3
San Diego, Cal	19	12	17	21	n. 30 w.	8
San Luis Obispo, Cal	21	14	6	22	n. 66 w.	18
West Indies						
Grand Turk, W. I. †	6	7	20	1	s. 87 e.	19
Hamilton, Bermuda	20	17	13	18	n. 59 w.	6
San Juan, Porto Rico	8	31	26	5	s. 42 e.	31

* From observations at 8 p. m. only. † From observations at 8 a. m. only.

TABLE IV.—*Accumulated amounts of precipitation for each 5 minutes, for storms in which the rate of fall equaled or exceeded 0.25 in any 5 minutes, or 0.75 in 1 hour during February, 1906, at all stations furnished with self-registering gages.*

Stations.	Date.	Total duration.		Total amount of precipitation.	Excessive rate.		Amount before excessive began.	Depths of precipitation (in inches) during periods of time indicated.													
		From—	To—		Began—	Ended—		5 min.	10 min.	15 min.	20 min.	25 min.	30 min.	35 min.	40 min.	45 min.	50 min.	60 min.	80 min.	100 min.	120 min.
	1	2	3	4	5	6	7														
Albany, N. Y.	9			1.37														*			
Alpena, Mich.	24–25			0.39														*			
Amarillo, Tex.	12–13			0.51														0.14			
Asheville, N. C.	20–21			0.60														0.42			
Atlanta, Ga.	20–21			0.08														0.06			
Atlantic City, N. J.	12–13			1.07														0.22			
Augusta, Ga.	11–12			0.71														0.12			
Baltimore, Md.	14			0.35									0.30								
Binghamton, N. Y.	9			0.65														*			
Birmingham, Ala.	24			0.88														0.32			
Bismarck, N. Dak.	7–8			0.05														*			
Block Island, R. I.	21–22			1.57														0.46			
Boise, Idaho.	18			0.19														0.12			
Boston, Mass.	9			1.02														0.26			
Buffalo, N. Y.	14			0.40														*			
Cairo, Ill.	13			0.36														0.30			
Charles City, Iowa.	12–13			1.45														*			
Charleston, S. C.	11–12			1.04														0.21			
Charlotte, N. C.	21			1.05														0.43			
Chattanooga, Tenn.	20–21			1.08														0.27			
Cheyenne, Wyo.	13			0.13														*			
Chicago, Ill.	24			0.75														*			
Cincinnati, Ohio.	20–21			0.45														0.16			
Cleveland, Ohio.	4–5			0.66														*			
Columbia, Mo.	23			0.54														0.29			
Columbia, S. C.	7–8			0.58														0.20			
Columbus, Ohio.	4–5			0.41														*			
Concord, N. H.	9			0.50														*			
Corpus Christi, Tex.	19			0.81														0.27			
Davenport, Iowa.	13			0.99														*			
Denver, Colo.	4			0.04														*			
Des Moines, Iowa.	13			0.51														*			
Detroit, Mich.	24–25			0.39														0.25			
Dodge, Kans.	12–13			0.87														*			
Dubuque, Iowa.	13			0.40														*			
Duluth, Minn.	11			0.14														*			
Eastport, Me.	9			0.98														*			
Elkins, W. Va.	14–15			0.30														0.06			
Erie, Pa.	4–5			0.31														*			
Escanaba, Mich.	13			0.24														*			
Evansville, Ind.	20–21			0.46														0.16			
Fort Smith, Ark.	23			0.40														0.31			
Fort Worth, Tex.	12			1.87														0.60			
Galveston, Tex.	13			1.27														0.64			
Grand Rapids, Mich.	20			0.54														0.17			
Green Bay, Wis.	13–14			0.76														*			
Hannibal, Mo.	13			0.52														0.17			
Harrisburg, Pa.	21			0.71														0.15			
Hartford, Conn.	9			1.30														*			
Hatteras, N. C.	8–9	6:10 a. m.	3:50 a. m.	4.34	10:50 p. m.	12:10 a. m.	1.52	0.11	0.27	0.34	0.44	0.66	0.84	1.05	1.33	1.58	1.71	1.98	2.62		
Huron, S. Dak.	8			0.16														*			
Indianapolis, Ind.	26			0.27														*			
Iola, Kans.	12–13			0.55														*			
Jacksonville, Fla.	11–12			2.42														0.36			
Jupiter, Fla.	4	6:55 a. m.	2:05 p. m.	3.02	7:48 a. m.	8:18 a. m.	0.20	0.18	0.33	0.51	0.70	1.02	1.20								
Kansas City, Mo.	20			0.52	12:30 p. m.	1:30 p. m.	1.73	0.13	0.21	0.33	0.38	0.49	0.58	0.67	0.78	0.90	0.96	1.11			
Key West, Fla.	11	5:00 a. m.	12:45 p. m.	2.01	8:25 a. m.	9:00 a. m.	0.06	0.17	0.23	0.40	0.43	0.48	0.55	0.60				0.31			
Knoxville, Tenn.	20–21			0.65	10:00 a. m.	10:59 a. m.	0.87	0.05	0.25	0.30	0.40	0.47	0.56	0.64	0.72	0.84	0.93	1.06			
La Crosse, Wis.	12–13			0.52														0.21			
La Salle, Ill.	20			0.62														*			
Lexington, Ky.	26–27			0.72														0.16			
Lincoln, Nebr.	12–13			0.56														*			
Little Rock, Ark.	23			1.07														*			
Los Angeles, Cal.	10			0.90														0.51			
Louisville, Ky.	24			0.23														0.60			
Lynchburg, Va.	21			0.35														0.17			
Macon, Ga.	21			0.30														0.21			
Madison, Wis.	13			0.54														0.17			
Memphis, Tenn.	24			0.46														*			
Meridian, Miss.	24	6:28 a. m.	9:35 a. m.	0.98	7:41 a. m.	8:06 a. m.	0.20	0.08	0.13	0.20	0.33	0.48						0.26			
Milwaukee, Wis.	13			0.65														*			
Minneapolis, Minn.	16			0.20														*			
Montgomery, Ala.	20			1.16														0.53			
Mount Weather, Va.	27			0.57														*			
Nantucket, Mass.	21–22			1.02														0.35			
Nashville, Tenn.	24			0.21														0.10			
New Haven, Conn.	21			0.98														0.43			
New Orleans, La.	6–7			0.82														0.22			
New York, N. Y.	25			0.64														0.30			
Norfolk, Va.	8–9			1.79														0.30			
Northfield, Vt.	9			1.47														*			
North Head, Wash.	20–21			1.40														0.24			
Oklahoma, Okla.	12			0.32														*			
Omaha, Nebr.	13			0.38														0.07			
Palestine, Tex.	12–13			2.31														0.67			
Parkersburg, W. Va.	21			0.43														0.10			
Pensacola, Fla.	20	6:50 p. m.	8:55 p. m.	0.79	7:29 p. m.	7:51 p. m.	0.06	0.07	0.23	0.43	0.64										
Peoria, Ill.	20			0.69														*			
Philadelphia, Pa.	21			0.63														0.19			
Pittsburg, Pa.	25			0.16														0.10			
Portland, Me.	9			0.76														*			
Portland, Oreg.	16–17			0.87														0.28			
Pueblo, Colo.	4			0.02														*			
Raleigh, N. C.	12			1.62														0.21			
Richmond, Va.	8–9			1.32														*			
Rochester, N. Y.	14			0.31														0.17			
Sacramento, Cal.	20–21			0.68														0.33			
St. Louis, Mo.	23			0.54																	

TABLE IV.—*Accumulated amounts of precipitation for each 5 minutes, etc.*—Continued.

Stations.	Date.	Total duration. From—	Total duration. To—	Total amount of precipitation.	Excessive rate. Began—	Excessive rate. Ended—	Amount before excessive began.	Depths of precipitation (in inches) during periods of time indicated. 5 min.	10 min.	15 min.	20 min.	25 min.	30 min.	35 min.	40 min.	45 min.	50 min.	60 min.	80 min.	100 min.	120 min.
	1	2	3	4	5	6	7														
St. Paul, Minn	11			0.12														*			
Salt Lake City, Utah	21			0.60														*			
San Antonio, Tex	17			0.13														0.13			
San Diego, Cal.	5–6			1.15														0.37			
Sandusky, Ohio	4			0.50														*			
San Francisco, Cal	14–15			1.32														0.39			
Savannah, Ga	11–12			1.39														0.24			
Scranton, Pa	21			0.64														0.17			
Seattle, Wash	18			1.30														0.19			
Shreveport, La	12–13			0.75														0.26			
Spokane, Wash.	18			0.54														*			
Springfield, Ill	23–24			0.86														0.21			
Springfield, Mo	20			0.70														*			
Syracuse, N. Y.	25			0.23														*			
Tampa, Fla	21			0.53														0.25			
Taylor, Tex.	12			1.26							0.41										
Toledo, Ohio	24–25			0.27														*			
Topeka, Kans	13			0.34														0.12			
Valentine, Nebr.	25			0.14														*			
Vicksburg, Miss	24			0.60														0.32			
Washington, D. C	25			0.32														0.25			
Wichita, Kans																					
Williston, N. Dak.	26			0.02																	
Wilmington, N. C.	7–8			1.55														0.42			
Wytheville, Va.	26–27			0.20														0.08			
Yankton, S. Dak	25–26			0.32														*			
San Juan, Porto Rico	25			0.25														0.25			

*Self-register not working

TABLE V.—*Data furnished by the Canadian Meteorological Service, February, 1906.*

Stations.	Pressure, in inches. Actual, reduced to mean of 24 hours.	Pressure, in inches. Sea level, reduced to mean of 24 hours.	Pressure, in inches. Departure from normal.	Temperature. Mean.	Temperature. Departure from normal.	Temperature. Mean maximum.	Temperature. Mean minimum.	Precipitation. Total.	Precipitation. Departure from normal.	Precipitation. Total snowfall.
	Ins.	*Ins.*	*Ins.*	°	°	°	°	*Ins.*	*Ins.*	*Ins.*
St. Johns, N. F	29.92	30.06	+.23	26.7	+ 4.7	34.5	18.9	6.82	+1.91	7.7
Sydney, C. B. I.	30.09	30.13	+.21	27.2	+ 7.9	34.9	19.5	6.95	+2.86	17.5
Halifax, N. S.	30.02	30.13	+.18	28.1	+ 5.7	36.6	19.7	5.22	+0.06	11.5
Grand Manan, N. B	30.06	30.11	+.13	25.9	+ 2.5	33.7	18.1	4.26	+0.29	13.0
Yarmouth, N. S	30.08	30.15	+.16	29.0	+ 3.2	37.1	20.9	4.74	0.00	13.1
Charlottetown, P. E. I	30.09	30.13	+.18	23.2	+ 5.6	31.8	14.6	3.05	−0.01	15.9
Chatham, N. B	30.10	30.12	+.16	19.2	+ 6.7	30.9	7.5	2.42	−0.74	17.4
Father Point, Que.	30.10	30.13	+.15	14.9	+ 3.4	23.8	5.9	1.18	−1.03	10.8
Quebec, Que.	29.83	30.18	+.19	13.8	+ 2.0	23.2	4.5	2.57	−0.70	20.4
Montreal, Que.	29.97	30.19	+.17	17.0	+ 2.5	26.0	7.9	2.30	−0.77	18.4
Rockliffe, Ont.	29.58	30.23	+.22	8.6	− 1.3	23.5	− 6.3	1.58	−0.42	15.1
Ottawa, Ont	29.84	30.19	+.17	15.8	+ 4.1	25.9	5.7	2.58	−0.11	18.0
Kingston, Ont.	29.90	30.24	+.20	18.8	+ 1.0	28.7	9.0	1.11	−1.43	7.1
Toronto, Ont	29.82	30.22	+.18	22.2	+ 0.7	31.2	13.3	0.80	−1.81	3.6
White River, Ont	28.80	30.21	+.19	2.2	+ 2.0	18.3	−13.9	1.18	−0.34	11.5
Port Stanley, Ont	29.56	30.24	+.18	22.1	− 0.7	31.3	12.9	1.04	−2.17	4.9
Saugeen, Ont.	29.47	30.21	+.19	20.2	+ 0.3	29.7	10.7	2.21	−0.69	16.0
Parry Sound, Ont	29.48	30.23	+.22	14.3	0.0	26.3	2.3	2.20	−0.72	15.0
Port Arthur, Ont.	29.47	30.22	+.17	9.6	+ 3.2	22.5	− 2.2	0.52	−0.38	4.8
Winnipeg, Man	29.33	30.23	+.13	1.8	+ 3.4	14.2	−10.5	0.21	−0.77	2.1
Minnedosa, Man	28.26	30.20	+.11	4.0	+ 6.7	16.3	− 8.2	0.12	−0.49	1.2
Qu'Appelle, Assin.	27.74	30.11	+.03	7.1	+ 7.7	16.4	− 2.2	0.49	−0.24	4.9
Medicine Hat, Assin	27.70	30.04	−.01	25.8	+14.6	38.6	13.0	0.10	−0.57	1.0
Swift Current, Assin	27.45	30.14	+.07	17.2	+ 9.2	27.7	6.8	0.52	−0.22	5.2
Calgary, Alberta	26.38	30.04	+.05	24.3	+10.8	36.5	12.1	0.14	−0.49	1.4
Banff, Alberta	25.31	30.06	+.08	23.0	+ 3.8	33.7	12.2	0.40	−0.52	3.3
Edmonton, Alberta										
Battleford, Sask	28.32	30.17	+.08	7.0	+ 6.9	17.4	− 3.3	0.22	−0.15	2.2
Kamloops, B. C.	28.76	30.01	+.05	34.4	+ 6.1	39.7	29.1	0.25	−0.54	1.5
Victoria, B. C.	29.84	29.94	−.06	44.0	+ 4.5	49.4	38.5	1.66	−2.44	0.0
Barkerville, B. C.	25.58	29.97	+.06	24.5	+ 5.6	33.2	15.8	0.60	−2.46	6.0
Hamilton, Bermuda	29.92	30.09	−.02	64.4	+ 2.9	69.0	60.0	8.52	+4.08	
Dawson, Yukon										

TABLE VI.—*Heights of rivers referred to zeros of gages, February, 1906.*

Stations.	Distance to mouth of river.	Danger line on gage.	Highest water.		Lowest water.		Mean stage.	Monthly range.
			Height.	Date.	Height.	Date.		
Milk River.	*Miles.*	*Feet.*	*Feet.*		*Feet.*		*Feet.*	*Feet.*
Havre, Mont. (20)	237	9	.....	.....	.....	.....	.....	.....
James River.								
Huron, S. Dak. (28)	139	9	.....	.....	.....	.....	.....	.....
Big Blue River.								
Beatrice, Nebr. (3)	92	14	3.4	25	2.2	8, 9, 17	2.5	1.2
Blue Rapids, Kans (12)	47	14	6.6	25	5.1	17	5.7	1.5
Republican River.								
Clay Center, Kans.	42	18	7.7	27	6.0	15	6.7	1.7
Solomon River.								
Beloit, Kans.	75	16	1.7	22, 23	0.5	{5-7, 11, 12} {17, 18}	1.2	1.2
Smoky Hill River.								
Lindsborg, Kans	109	20	2.2	5	0.8	9, 16, 26	1.3	1.4
Abilene, Kans.	45	22	2.1	6	0.9	21	1.2	1.2
Kansas River.								
Manhattan, Kans.	116	18	4.5	28	2.4	6	3.6	2.1
Topeka, Kans. (10)	87	21	7.8	19, 20	6.8	1–4	7.3	1.0
Osage River.								
Bagnell, Mo.	70	28	10.2	28	2.8	12	5.4	7.4
Gasconade River.								
Arlington, Mo.	98	16	3.0	1, 2, 25	1.0	8–15	1.9	2.0
Missouri River.								
Bismarck, N. Dak.	1,309	14	1.3	21	0.7	1, 2	1.0	0.6
Pierre, S. Dak. (24)	1,114	14	.....	.....	.....	.....	.....	.....
Sioux City, Iowa	784	19	7.7	26	5.1	{8–10, 13, 14, 17, 18}	5.7	2.6
Blair, Nebr.	705	15	6.8	23	4.8	27, 28	6.0	2.0
Omaha, Nebr. (5)	669	18	6.0	26	3.5	3, 4, 13, 14	4.2	2.5
St. Joseph, Mo	481	10	4.8	25	— 1.2	14	1.4	6.0
Kansas City, Mo.	388	21	10.6	27, 28	5.4	17, 19, 20	6.9	5.2
Glasgow, Mo.	231	18	10.9	28	2.8	14	5.3	8.1
Boonville, Mo.	199	20	13.6	28	5.9	10, 11, 13	8.2	7.7
Hermann, Mo.	103	24	15.4	28	5.8	13	8.7	9.6
Minnesota River.								
Mankato, Minn.	127	18	4.6	28	2.9	11-16, 18, 19	3.3	1.7
St. Croix River.								
Stillwater, Minn. (23)	23	11	.....	.....	.....	.....	.....	.....
Red Cedar River.								
Cedar Rapids, Iowa	77	14	8.4	28	3.3	14–17	4.2	5.1
Iowa River.								
Iowa City, Iowa (21)	57	.....	.....	.....	.....	.....	.....	.....
Des Moines River.								
Des Moines, Iowa (13)	205	19	7.8	27	2.4	1	4.2	5.4
Illinois River.								
La Salle, Ill	197	18	20.9	26	17.3	20	18.6	3.6
Peoria, Ill.	135	14	15.5	28	12.5	20	13.5	3.0
Beardstown, Ill.	70	12	12.7	28	10.9	1	11.5	1.8
Red Bank Creek.								
Brookville, Pa.	42	8	1.0	1–28	1.0	1–28	1.0	0.0
Clarion River.								
Clarion, Pa.	32	10	4.0	4	2.3	28	3.0	1.7
Conemaugh River.								
Johnstown, Pa.	64	7	2.9	22	1.4	20, 21	2.0	1.5
Allegheny River								
Warren, Pa.	177	14	2.5	1	0.9	14–17	1.3	1.6
Franklin, Pa	114	15	3.2	26	1.0	13	2.0	2.2
Parker, Pa.	73	20	3.1	25	1.4	21	2.1	1.7
Freeport, Pa.	29	20	11.0	28	5.0	5, 9	6.6	6.0
Springdale, Pa.	17	27	10.1	1	7.3	9	8.1	2.8
Cheat River.								
Rowlesburg, W. Va. (29)	36	14	.....	.....	.....	.....	.....	.....
Youghiogheny River.								
Confluence, Pa.	59	10	2.0	1	0.9	11-14, 17-21	1.2	1.1
West Newton, Pa. (30)	15	23	.....	.....	.....	.....	.....	.....
Monongahela River.								
Weston, W. Va.	161	18	1.1	22, 27, 28	— 0.2	11, 12	0.3	1.3
Fairmont, W. Va.	119	25	17.1	23	15.0	8–21	15.3	2.1
Greensboro, Pa. (1)	81	18	9.9	23	7.2	8–21	7.7	2.7
Lock No. 4, Pa.	40	28	10.8	24	6.8	13	7.7	4.0
Beaver River.								
Ellwood Junction, Pa. (17)	10	14	.....	.....	.....	.....	.....	.....
Muskingum River.								
Zanesville, Ohio	70	25	10.3	24	8.5	4, 7, 8, 11, 12	9.0	1.8
Beverly, Ohio.	20	25	7.6	25	5.2	12, 13	5.9	2.4
Little Kanawha River.								
Glenville, W. Va	77	20	4.0	22	— 0.6	9	0.9	4.6
Creston, W. Va.	38	20	7.9	23	2.5	14	3.5	5.4
New River.								
Radford, Va	155	14	1.8	1	0.6	8, 9, 17–20	0.8	1.2
Hinton, W. Va.	95	14	4.2	1	2.2	14, 15, 19-22	2.6	2.0
Great Kanawha River.								
Charleston, W. Va.	58	30	7.8	24	3.8	14	5.6	4.0
Scioto River.								
Columbus, Ohio (11)	110	17	3.7	26, 27	3.0	1, 19, 20	3.4	0.7
Licking River.								
Falmouth, Ky. (18)	30	25	4.5	22	2.0	19–21	2.9	2.5
Miami River.								
Dayton, Ohio.	77	18	2.5	5	1.7	28	2.0	0.8
Kentucky River.								
Jackson, Ky.	287	24	5.6	25, 28	5.0	{1–4, 8–13} {18–20}	5.2	0.6
Beattyville, Ky	254	30	4.0	23	0.5	18–20	1.4	3.5
High Bridge, Ky.	117	17	11.9	25	9.8	10, 19–21	10.5	2.1
Frankfort, Ky.	65	31	7.7	26	6.3	11, 20–22	6.8	1.4
Wabash River.								
Terre Haute, Ind.	171	16	9.0	1	1.4	11, 12	3.9	7.6
Mount Carmel, Ill. (7)	75	15	15.4	1	4.0	14	7.0	11.4
Cumberland River.								
Burnside, Ky.	518	50	12.1	24	2.2	21	4.6	9.9
Celina, Tenn.	383	45	13.3	25	3.5	20, 21	6.6	9.8
Carthage, Tenn.	308	40	9.5	26	3.0	20	5.2	6.5
Nashville, Tenn.	193	40	13.4	27	8.9	19–22	10.5	4.5
Clarksville, Tenn.	126	42	14.0	28	5.3	23	8.9	8.7
Powell River.								
Tazewell, Tenn.	44	20	2.6	1	0.6	20	1.3	2.0
Clinch River.								
Speers Ferry, Va.	156	20	2.8	1	— 0.2	18–20	0.6	3.0
Clinton, Tenn	52	25	9.7	1	4.5	17	6.2	5.2
South Fork Holston River.								
Bluff City, Tenn.	35	15	2.6	1	1.1	20, 21	1.5	1.5
Holston River.								
Mendota, Va. (6)	165	12	2.2	2	0.9	19–21	1.3	1.3
Rogersville, Tenn.	103	14	4.0	1	2.2	{13, 14, 16, 20–22}	2.6	1.8
French Broad River.								
Asheville, N. C.	144	6	2.0	1	0.5	{16, 20, 21, 26–28}	0.8	1.5
Leadvale, Tenn.	70	15	4.0	1	1.3	19–21	2.0	2.7
Dandridge, Tenn	46	15	3.9	1	1.6	21	2.2	2.3
Little Tennessee River.								
McGhee, Tenn.	17	20	4.8	1	3.5	20, 21	4.0	1.3
Hiwassee River.								
Charleston, Tenn	18	22	3.8	1	1.0	15, 16	2.2	2.8
Tennessee River.								
Knoxville, Tenn.	635	29	6.6	1	2.3	21	3.3	4.3
Loudon, Tenn	590	25	5.8	1	2.7	20, 21	3.6	3.1
Kingston, Tenn.	556	25	6.0	1	2.8	19–22	3.6	3.2
Chattanooga, Tenn.	452	33	9.6	1	4.4	20, 21	5.9	5.2
Bridgeport, Ala.	402	24	7.8	1	2.8	17–20	4.2	5.0
Guntersville, Ala.	349	31	11.8	1	5.0	20, 21	7.6	6.8
Florence, Ala.	255	16	8.0	1	2.8	20–22	4.5	5.2
Riverton, Ala.	225	26	13.7	1	5.0	20, 22	7.6	8.7
Johnsonville, Tenn.	95	21	17.7	1	4.7	22	7.7	13.0
Ohio River.								
Pittsburg, Pa.	966	22	4.9	24	1.4	12	2.6	3.5
Davis Island Dam, Pa.	960	25	7.0	24	3.9	9–13	5.0	3.1
Beaver Dam, Pa	925	27	9.2	26	4.8	13, 14	6.4	4.4
Wheeling, W. Va.	875	36	8.6	1, 26	4.2	10	5.9	4.4
Parkersburg, W. Va.	785	36	9.8	1	5.6	14	7.4	4.2
Point Pleasant, W. Va.	703	39	13.8	1	4.2	14	7.1	9.6
Huntington, W. Va.	660	50	19.1	1	7.5	14	11.0	11.6
Catlettsburg, Ky.	651	50	19.7	1	6.2	14	10.2	13.5
Portsmouth, Ohio	612	50	21.2	1	7.6	15	11.5	13.6
Maysville, Ky.	559	50	22.3	1	7.8	15	11.6	14.5
Cincinnati, Ohio.	499	50	26.1	1	9.5	18	13.9	16.6
Madison, Ind	413	46	23.3	1	8.8	17, 18	12.7	14.5
Louisville, Ky	367	28	9.4	1	4.2	18–20	5.7	5.2
Evansville, Ind	184	35	25.8	1	7.2	21	12.0	18.6
Mount Vernon, Ind. (5)	148	35	26.3	1	7.0	22, 27	11.9	19.3
Paducah, Ky.	47	40	29.0	1	8.0	22, 23	14.3	21.0
Cairo, Ill.	1	45	35.1	1	15.5	21	22.1	19.6
St. Francis River.								
Marked Tree, Ark.	104	17	16.8	1, 2	14.7	28	15.9	2.1
Neosho River.								
Neosho Rapids, Kans.	326	22	1.2	26	0.9	6–12	1.0	0.3
Iola, Kans	262	10	0.6	25	0.2	12, 13	0.3	0.4
Oswego, Kans.	184	20	2.8	24, 25	0.5	14, 15	1.0	2.3
Fort Gibson, Ind. T	3	22	13.8	1	10.8	22, 23	11.6	3.0
Canadian River.								
Calvin, Ind. T	99	10	3.7	20	2.7	4, 8, 10–12	3.0	1.0
Black River.								
Blackrock, Ark.	67	12	19.6	1	9.0	23	13.9	10.6
White River.								
Calicorock, Ark	272	15	7.9	25, 26	3.3	13	5.4	4.6
Batesville, Ark.	217	18	10.8	26	5.4	13	7.7	5.4
Newport, Ark.	185	26	23.0	1	12.0	22	16.3	11.0
Clarendon, Ark.	75	30	29.6	3, 4	24.8	27, 28	27.2	4.8
Arkansas River.								
Wichita, Kans.	832	10	1.8	5	— 0.5	7	0.2	2.3
Tulsa, Ind. T. (2)	551	16	3.0	9, 25	2.6	{1–6, 14–17, 19–24}	2.7	0.4
Webbers Falls, Ind. T	465	23	7.5	1	5.8	17	6.5	1.7
Fort Smith, Ark.	403	22	9.3	1	4.7	12, 13	6.6	4.6
Dardanelle, Ark	256	21	9.9	2	4.8	13	7.0	4.1
Little Rock, Ark.	176	23	11.9	26	6.9	14, 15	9.1	5.0
Yazoo River.								
Greenwood, Miss	175	38	16.9	1	5.3	24	11.8	11.6
Yazoo City, Miss.	80	25	15.3	8–10	3.6	26	11.1	11.7
Ouachita River.								
Camden, Ark.	304	39	25.4	1	10.5	20	15.7	14.9
Monroe, La	122	40	35.0	9, 10	29.7	28	33.4	5.3
Red River.								
Denison, Tex.	768	22	2.4	13	0.5	9–12	0.9	1.9
Arthur City, Tex.	688	27	15.0	14	6.3	5	9.3	8.7
Fulton, Ark.	515	28	22.5	1	11.8	14	17.9	10.7
Shreveport, La.	327	29	17.0	1	10.3	15, 16	13.7	6.7
Alexandria, La.	118	33	25.6	2, 3	17.0	19	21.6	8.6
Mississippi River.								
St. Clond, Minn. (26)	2,034	4	.....	.....	.....	.....	.....	.....
St. Paul, Minn. (25)	1,954	14	.....	.....	.....	.....	.....	.....
Red Wing, Minn. (25)	1,914	14	.....	.....	.....	.....	.....	.....
Reeds Landing, Minn. (3)	1,884	12	2.9	6–8, 28	2.3	20–23	2.6	0.6
La Crosse, Wis. (28)	1,819	12	.....	.....	.....	.....	.....	.....
Prairie du Chien, Wis. (28)	1,759	18	.....	.....	.....	.....	.....	.....
Dubuque, Iowa (28)	1,699	18	.....	.....	.....	.....	.....	.....
Clinton, Iowa (28)	1,629	16	.....	.....	.....	.....	.....	.....
Leclaire, Iowa (28)	1,609	10	.....	.....	.....	.....	.....	.....
Davenport, Iowa	1,593	15	7.7	26	3.3	12, 13	4.7	4.4
Muscatine, Iowa	1,562	16	9.4	28	4.6	20	6.0	4.8
Galland, Iowa	1,472	8	5.7	28	2.1	13	3.3	3.6
Keokuk, Iowa.	1,463	15	10.1	26–28	3.5	11, 13	5.4	6.6
Warsaw, Ill.	1,458	18	13.5	26	6.7	13	8.6	6.8
Hannibal, Mo	1,402	13	12.4	27	4.8	13–15	6.7	7.6
Grafton, Ill	1,306	23	15.3	28	7.7	12–16	9.4	7.6
St. Louis, Mo	1,264	30	22.1	28	7.9	13	11.9	14.2
Chester, Ill	1,189	30	18.1	28	7.2	13	10.4	10.9
Cape Girardeau, Mo.	1,128	28	21.9	28	11.6	14	14.9	10.3

TABLE VI.—*Heights of rivers referred to zeros of gages*—Continued.

Stations.	Distance to mouth of river.	Danger line on gage.	Highest water.		Lowest water.		Mean stage.	Monthly range.
			Height.	Date.	Height.	Date.		
Mississippi River—Cont'd.	*Miles.*	*Feet.*	*Feet.*		*Feet.*		*Feet.*	*Feet.*
New Madrid, Mo.	1,093	34	28.4	1	12.7	22	18.3	15.7
Luxora, Ark (8)	905	35	22.0	1	5.9	22–24	11.8	16.1
Memphis, Tenn	843	33	27.1	1	8.8	23,24	15.9	18.3
Helena, Ark.	767	42	35.9	1–4	14.4	24–26	24.1	21.5
Arkansas City, Ark.	635	42	40.8	5–7	21.2	26	32.1	19.6
Greenville, Miss.	595	42	34.9	7	17.1	26,27	27.1	17.8
Vicksburg, Miss.	474	45	38.0	8–10	18.8	28	31.2	19.2
Natchez, Miss.	373	46	38.3	11	22.4	28	33.2	15.9
Baton Rouge, La.	240	35	28.4	12	18.6	28	25.6	9.8
Donaldsonville, La	188	28	22.3	10–12	13.7	28	20.0	8.6
New Orleans, La.	108	16	14.5	9,12	9.2	28	13.0	5.3
Atchafalaya River.								
Simmesport, La.	127	33	32.9	10–13	23.5	28	30.4	9.4
Melville, La.	103	31	32.2	10–14	26.0	28	30.6	6.2
Morgan City, La	19	8	4.3	13	2.0	17	3.4	2.3
Grand River.								
Eaton Rapids, Mich.	166	6	3.9	1,2	3.6	{11,12,15,} {17–24}	3.7	0.3
Lansing, Mich.	140	11	4.9	1	2.0	18	3.3	2.9
Grand Ledge, Mich.	129	6	4.6	1	3.0	21–24	3.6	1.6
Portland, Mich	103	12	9.1	28	4.4	1,2	5.6	4.7
Ionia, Mich	81	24	14.4	26	9.3	13	11.4	5.1
Lowell, Mich.	65	19	8.9	26	4.6	5	6.4	4.3
Grand Rapids, Mich.	38	12	6.6	25,26	2.0	4	3.9	4.6
Sandusky River.								
Tiffin, Ohio (17)	65	8	.....	.....	.....	.....	.....	.....
Maumee River.								
Napoleon, Ohio (18)	44	13	.....	.....	.....	.....	.....	.....
Penobscot River.								
Mattawamkeag, Me. (28)	87	..	.....	.....	.....	.....	.....	.....
West Enfield, Me. (28)	60	..	.....	.....	.....	.....	.....	.....
Kennebec River.								
Winslow, Me	46	8	4.8	28	3.3	7	4.0	1.5
Merrimac River.								
Franklin Junction, N. H.	110	13	5.2	1,2	4.1	21,22	4.8	1.2
Concord, N. H. (24)	94	10	.....	.....	.....	.....	.....	.....
Manchester, N. H	68	8	4.1	25	1.5	3	2.9	2.6
Connecticut River.								
Wells River, Vt. (28)	255	.....	.....	.....	.....	.....	.....	.....
Whiteriver Junction, Vt.	209	.....	8.3	23	5.8	4–7	6.7	2.5
Bellows Falls, Vt. (2)	170	12	4.0	25	2.0	1	2.6	2.0
Holyoke, Mass	84	9	3.9	25	0.9	5	2.4	3.0
Hartford, Conn.	50	13	7.8	24	3.7	7,8	5.1	4.1
Housatonic River.								
Gaylordsville, Conn.	44	15	6.3	23	3.9	20	4.6	2.4
Mohawk River.								
Utica, N. Y.	98	6	7.6	22	3.5	5–7	4.3	4.1
Tribeshill, N. Y.	42	12	4.5	22	0.9	12	1.6	3.6
Schenectady, N. Y.	19	15	10.5	23	0.8	15–19	2.4	9.7
Hudson River.								
Glens Falls, N. Y.	197	20	5.2	1	4.0	7,9,16–18	4.3	1.2
Troy, N. Y.	154	14	9.6	24	4.2	19	5.8	5.4
Albany, N. Y.	147	12	7.6	27	1.4	3	3.8	6.2
Stuyvesant, N. Y.	128	9	4.5	1	— 1.5	6	1.4	6.0
Pompton River.								
Pompton Plains, N. J.	6	8	5.0	22	4.0	5–21	4.2	1.0
Passaic River.								
Chatham, N. J. (19)	69	7	.....	.....	.....	.....	.....	.....
Lehigh River.								
Mauchchunk, Pa. (21)	45	15	.....	.....	.....	.....	.....	.....
Schuylkill River.								
Reading, Pa.	66	12	5.9	22	0.4	{7,8,12,} {17,20}	1.1	5.5
Delaware River.								
Hancock (E. Branch), N. Y.	269	12	5.3	26	3.8	2	4.4	1.5
Hancock (W. Branch), N. Y.	269	10	6.4	22	3.7	2	4.7	2.7
Port Jervis, N. Y. (13)	204	14	4.3	26	0.5	9	2.1	3.8
Phillipsburg, N. J. (19)	142	26	.....	.....	.....	.....	.....	.....
Trenton, N. J.	92	18	4.5	22	1.7	6	2.7	2.8
North Branch Susquehanna.								
Binghamton, N. Y.	183	16	5.8	26	2.3	20	3.3	3.5
Towanda, Pa	139	16	4.5	7–11,23	1.8	5	3.7	2.7
Wilkes-Barre, Pa.	60	17	10.5	24	4.3	17,18	6.0	6.2
West Branch Susquehanna.								
Clearfield, Pa.	165	8	1.6	1,2	1.3	27,28	1.4	0.3
Renovo, Pa. (22)	90	16	.....	.....	.....	.....	.....	.....
Williamsport, Pa.	39	20	3.8	1	1.3	28	2.1	2.5
Juniata River.								
Huntingdon, Pa.	90	24	4.2	4,22	3.3	18–21	3.7	0.9
Susquehanna River.								
Selinsgrove, Pa.	116	17	4.0	26	1.2	13	2.1	2.8
Harrisburg, Pa.	69	17	4.6	27	1.9	7	2.8	2.7
Shenandoah River.								
Riverton, Va.	58	22	— 0.3	9,10	— 0.5	{1–8,11–16,} {18–28}	—0.5	0.2
Potomac River.								
Cumberland, Md.	290	8	3.5	1	2.8	15–20,22–28	3.0	0.7
Harpers Ferry, W. Va.	172	18	3.0	1	0.8	20,21	1.4	2.2
James River.								
Buchanan, Va.	305	12	4.2	1	2.5	19–28	2.9	1.7
Lynchburg, Va	260	18	2.5	1	0.8	19–21,26–28	1.2	1.7
Columbia, Va.	167	18	7.1	1	3.1	26,27	4.4	4.0
Richmond, Va.	111	12	1.6	1	0.2	18	0.8	1.4
Dan River.								
Danville, Va.	55	8	0.7	28	0.0	18–21	0.2	0.7
Staunton River.								
Randolph, Va	26	28	7.6	1	4.8	28	5.8	2.8
Roanoke River.								
Clarksville, Va	196	12	2.5	10	0.7	19–21	1.3	1.8
Weldon, N. C.	129	30	18.2	1	10.6	20,21	12.6	7.6
Tar River.								
Tarboro, N. C.	46	25	20.3	17	5.3	6–8	11.0	15.0
Greenville, N. C.	21	22	15.5	18	6.7	8	11.0	8.8
Haw River.								
Moncure, N. C.	171	25	12.4	9	6.3	6	8.6	6.1

Stations.	Distance to mouth of river.	Danger line on gage.	Highest water.		Lowest water.		Mean stage.	Monthly range.
			Height.	Date.	Height.	Date.		
Cape Fear River.	*Miles.*	*Feet.*	*Feet.*		*Feet.*		*Feet.*	*Feet*
Fayetteville, N. C.	112	38	24.0	10	8.0	6,21,27,28	12.9	16.0
Waccamaw River.								
Conway, S. C.	40	7	8.8	22,23	6.2	1	7.7	2.6
Pedee River.								
Cheraw, S. C	149	27	13.9	1	3.5	21,27	6.1	10.4
Smiths Mills, S. C.	51	16	16.4	3,4	10.0	24	13.6	6.4
Lynch Creek.								
Effingham, S. C.	35	12	14.0	2,3	7.0	27,28	10.7	7.0
Black River.								
Kingstree, S. C.	45	12	11.2	16,17	8.2	13	10.0	3.0
Catawba River.								
Mount Holly, N. C.	28	15	2.9	1	2.4	19–21	2.7	0.5
Wateree River.								
Camden, S. C.	37	24	16.4	1	7.8	19	10.2	8.6
Broad River.								
Blairs, S. C	36	14	4.5	1	1.3	20	2.5	3.2
Saluda River.								
Chappels, S. C.	56	14	7.8	1	4.0	19,21	5.2	3.8
Congaree River.								
Columbia, S. C	52	15	4.8	2	1.7	18,20	2.8	3.1
Santee River.								
St. Stephens, S. C.	50	12	12.3	3	7.8	25–28	9.3	4.5
Edisto River.								
Edisto, S. C.	75	6	5.2	1	4.2	28	4.7	1.0
Broad River.								
Carlton, Ga.	30	11	3.5	1	2.5	14-20,23-28	2.7	1.0
Savannah River.								
Calhoun Falls, S. C.	347	15	4.0	9	2.8	21	3.2	1.2
Augusta, Ga.	268	32	12.5	10	9.0	28	10.6	3.5
Oconee River.								
Milledgeville, Ga.	147	25	7.0	9	3.9	28	4.8	3.1
Dublin, Ga	79	30	13.9	1	3.0	27,28	5.6	10.9
Ocmulgee River.								
Macon, Ga.	203	18	6.5	9	3.6	28	4.8	2.9
Abbeville, Ga.	96	11	13.1	1	6.3	28	8.4	6.8
Flint River.								
Woodbury, Ga.	227	10	1.6	1	0.9	26–28	1.2	0.7
Montezuma, Ga.	152	20	8.5	1	5.0	28	6.4	3.5
Albany, Ga.	90	20	14.1	1	5.0	28	7.3	9.1
Bainbridge, Ga	29	22	18.1	1	9.4	28	11.8	8.7
Chattahoochee River.								
Oakdale, Ga	305	18	4.0	1	2.3	24,25,28	3.1	1.7
West Point, Ga	239	20	4.6	1	3.2	27,28	3.7	1.4
Eufaula, Ala	90	40	8.5	1	3.0	24	5.1	5.5
Alaga, Ala	30	25	12.4	10	6.4	27,28	8.6	6.0
Coosa River.								
Rome, Ga.	271	30	5.6	1	2.0	25–28	2.9	3.6
Gadsden, Ala.	144	22	7.0	1	2.6	21	3.8	4.4
Lock No. 4, Ala.	116	17	6.2	1	2.4	20,21	3.4	3.8
Wetumpka, Ala	6	45	12.2	1	6.4	20	8.0	5.8
Tallapoosa River.								
Milstead, Ala.	38	35	5.2	10	3.0	20	3.8	2.2
Alabama River.								
Montgomery, Ala.	265	35	10.8	1	3.8	20	6.0	7.0
Selma, Ala	212	35	13.4	1	5.7	21	8.3	7.7
Black Warrior River.								
Tuscaloosa, Ala.	90	43	18.0	26	7.0	20	10.2	11.0
Tombigbee River.								
Columbus, Miss	303	33	3.8	28	— 1.2	13,17,20,21	— 0.1	5.0
Vienna, Ala.	233	42	8.3	28	2.2	16,17	3.7	6.1
Demopolis, Ala.	155	35	32.5	1	4.2	21	10.2	28.3
Leaf River.								
Hattiesburg, Miss	60	20	7.0	27	4.0	6,22	4.8	3.0
Chickasawhay River.								
Enterprise, Miss	144	18	4.8	25	2.2	20	2.8	2.6
Shubuta, Miss.	106	25	10.0	25	4.0	2–10	5.4	6.0
Pascagoula River.								
Merrill, Miss. (8)	78	20	10.7	1	5.2	23	6.9	5.5
Pearl River.								
Jackson, Miss	242	20	10.0	1	3.2	21–24	4.7	6.8
Columbia, Miss.	110	14	9.7	1	6.0	20	7.3	3.7
Sabine River.								
Logansport, La.	315	25	19.8	1	13.4	13	17.1	6.4
Neches River.								
Rockland, Tex	105	20	11.3	2	5.4	9–11	7.6	5.9
Beaumont, Tex.	18	10	2.1	5,7	1.2	27,28	1.7	0.9
Trinity River.								
Dallas, Tex.	320	25	27.8	14	4.8	11,12	11.0	23.0
Long Lake, Tex.	211	35	35.6	22	9.2	12	23.3	26.4
Riverside, Tex.	112	40	22.0	16	5.5	12	14.7	16.5
Liberty, Tex	20	25	21.6	20	10.2	13	16.5	11.4
Brazos River.								
Kopperl, Tex.	345	21	0.0	1,13–28	— 0.2	2–12	—0.1	0.2
Waco, Tex.	285	24	6.0	13	2.8	8,9,12	3.5	3.2
Valley Junction, Tex.	215	40	12.9	14	2.3	9–12	4.3	10.6
Hempstead, Tex	140	40	19.3	15	0.7	12	6.2	18.6
Booth, Tex	61	39	11.5	17	5.4	10	7.2	6.1
Colorado River.								
Ballinger, Tex.	489	21	2.0	12	1.6	1-11,24-28	1.7	0.4
Austin, Tex.	214	18	1.9	14	1.2	3,27,28	1.4	0.7
Columbus, Tex.	98	24	18.5	14	6.6	1–12	7.7	11.9
Guadalupe River.								
Gonzales, Tex.	112	22	14.0	14	0.8	{1–4,6–8,} {10,11,23–} {26,28}	1.4	13.2
Victoria, Tex	35	16	14.8	16	1.7	8,9	2.9	13.1
Red River of the North.								
Moorhead, Minn. (26)	284	26	.....	.....	.....	.....	.....	.....
Kootenai River.								
Bonners Ferry, Idaho (15)	123	24	.....	.....	.....	.....	.....	.....
Pend d'Oreille River.								
Newport, Wash.	86	14	— 0.6	26–28	— 1.6	9–14	—1.3	1.0

TABLE VI.—*Heights of rivers referred to zeros of gages*—Continued.

Stations.	Distance to mouth of river.	Danger line on gage.	Highest water.		Lowest water.		Mean stage.	Monthly range.
			Height.	Date.	Height.	Date.		
Snake River.	*Miles*	*Feet.*	*Feet.*		*Feet.*		*Feet.*	*Feet.*
Lewiston, Idaho	144	24	3.2	21–23	0.9	10, 11	1.8	2.3
Riparia, Wash.	67	30	4.0	25, 26	2.1	1	3.1	1.9
Columbia River.								
Wenatchee, Wash	473	40	6.0	28	4.7	3, 4	5.1	1.3
Umatilla, Oreg.	270	25	3.0	24–26	1.0	17, 18	1.7	2.0
The Dalles, Oreg.	166	40	4.5	25	0.1	12–14	1.6	4.4
Willamette River.	*Miles.*	*Feet.*	*Feet.*		*Feet.*		*Feet.*	*Feet.*
Albany, Oreg.	118	20	14.6	26	3.2	14, 15	6.9	11.4
Salem, Oreg	84	20	13.2	26	2.2	14, 15	6.4	11.0
Portland, Oreg.	12	15	10.6	27	1.9	14	5.4	8.7
Sacramento River.								
Red Bluff, Cal.	201	23	13.0	15, 23	2.7	5–9	6.9	10.3
Sacramento, Cal.	64	25	21.5	28	16.1	11	18.3	5.4

Figures after names of stations indicate number of days frozen. (*) 1 day missing.

Honolulu, T. H., latitude 21° 19′ north, longitude 157° 52′ west; barometer above sea, 38 feet; gravity correction, —.057, applied. February, 1906.

Day.	Pressure.*		Air temperature.				Moisture.				Wind.				Precipitation.		Clouds.					
							8 a. m.		8 p. m.		8 a. m.		8 p. m.				8 a. m.			8 p. m.		
	8 a. m.	8 p. m.	8 a. m.	8 p. m.	Maximum.	Minimum.	Wet.	Relative humidity.	Wet.	Relative humidity.	Direction.	Velocity.	Direction.	Velocity.	8 a. m.	8 p. m.	Amount.	Kind.	Direction.	Amount.	Kind.	Direction.
1	30.01	30.00	66.5	65.3	73	59	58.6	62	58.4	66	n.	2	n.	5	0.00	0.00	1	Cu.	ne.	2	Ci.-cu.	w.
																				1	S.-cu.	?
2	30.01	29.98	69.0	68.0	74	60	61.3	64	61.5	69	ne.	3	ne.	5	0.00	0.00	3	A.-s.	w.	4	A.-cu.	w.
																	1	Cu.	w.	1	Cu.	w.
3	29.98	29.98	69.6	67.2	75	63	63.3	71	62.2	75	n.	2	nw.	4	0.00	0.00	5	Ci.-cu.	w.	1	S.-cu.	0
																	1	S.-cu.	0			
4	29.98	29.96	68.8	67.4	73	62	61.3	65	61.8	73	ne.	4	n.	5	0.00	0.00	few.	S. cu.	0	few.	S.-cu.	0
5	29.95	29.92	69.0	69.1	74	63	63.2	73	63.5	74	ne.	2	w.	7	0.00	T.	few.	Cu.	0	10	S.-cu.	nw.
6	29.96	29.97	65.2	65.0	74	59	58.6	68	58.4	68	nw.	2	n.	5	0.00	0.00	few.	S.-cu.	nw.	few.	S.-cu.	0
7	29.98	29.96	66.3	70.2	72	57	58.8	64	63.0	67	n.	3	sw.	9	0.00	0.00	few.	S.-cu.	0	8	S.-cu.	sw.
8	30.04	30.03	68.5	68.0	74	63	62.5	72	62.0	71	ne.	3	e.	4	0.00	0.00	9	S.-cu.	w.	few.	S.-cu.	0
9	30.01	29.99	72.5	72.0	75	66	66.1	71	64.1	65	e.	5	sw.	13	0.00	T.	2	S.-cu.	se.	few.	Cu.	s.
10	30.02	30.01	72.5	73.5	76	70	67.8	79	67.0	71	sw.	25	w.	15	0.01	0.00	2	Ci.-s.	sw.	4	Cu.	w.
																	2	S.-cu.	w.	3	S.-cu.	w.
11	30.01	30.03	72.0	73.5	76	70	67.6	80	67.5	74	w.	3	w.	6	0.00	0.00	2	Cu.	w.	5	S.-cu.	w.
																	4	S.-cu.	w.			
12	30.04	30.06	73.1	72.5	76	67	67.6	75	68.3	81	sw.	12	sw.	10	0.12	0.01	1	Cu.	w.	9	S.-cu.	w.
																	1	S.-cu.	w.			
13	30.09	30.06	71.3	70.0	76	64	63.8	66	64.6	75	n.	3	ne.	3	0.00	0.00	few.	Cu.	0	2	S.-cu.	0
14	30.10	30.07	72.0	69.1	77	64	66.3	74	63.6	74	ne.	1	w.	3	0.00	0.00	2	Ci.	nw.	1	S.-cu.	0
																	1	Cu.	0			
15	30.09	30.07	73.5	71.2	77	65	65.2	64	66.2	77	n.	1	se.	2	0.00	0.00	few.	Cu.	0	few.	S.-cu.	0
16	30.10	30.10	72.5	70.5	76	65	65.9	71	66.0	79	e.	2	n.	4	0.00	0.00	few.	Cu.	0	0	0	0
17	30.17	30.17	73.0	72.0	80	66	64.7	64	64.3	66	n.	1	e.	1	0.00	0.00	1	Ci.-cu.	0	few.	S.-cu	0
18	30.18	30.16	69.9	71.0	76	66	65.0	77	66.0	77	n.	3	n.	3	0.00	0.00	few.	S.-cu.	0	few.	S.-cu.	0
19	30.19	30.14	73.0	73.0	78	70	66.3	70	65.8	68	ne.	8	ne.	8	T.	0.00	2	Ci.	w.	7	S.-cu.	e.
																	5	S.-cu.	e.			
20	30.16	30.15	72.3	72.0	78	68	65.5	70	63.8	64	e.	11	e.	4	0.02	0.00	8	S.-cu.	e.	1	S.-cu.	e.
21	30.16	30.13	73.7	71.4	79	69	64.0	59	66.2	76	ne.	10	ne.	10	0.00	T.	2	S.-cu.	e.	5	S.-cu.	se.
																				5	N.	se.
22	30.15	30.09	72.0	72.6	79	69	66.0	73	64.5	65	e.	4	ne.	8	0.01	T.	5	S.-cu.	e.	few.	S.-cu.	0
																	5	N.	e.			
23	30.13	30.11	73.2	70.0	75	70	67.3	74	67.5	88	e.	15	ne.	6	T.	0.01	4	Ci.-s.	w.	10	N.	0
																	6	S.-cu.	e.			
24	30.12	30.07	70.0	71.2	78	69	67.4	88	65.3	73	e.	5	ne.	2	0.04	T.	10	S.-cu.	e.	2	S.-cu.	e.
25	30.05	30.02	71.3	72.0	77	70	64.8	70	66.0	73	ne.	6	ne.	6	0.00	T.	9	S.-cu.	e.	5	S.-cu.	e.
																				4	N.	e.
26	30.05	30.04	71.3	71.6	78	67	67.3	81	65.5	72	ne.	4	e.	9	0.03	0.01	8	S.-cu.	e.	1	S.-cu.	e.
																				3	N.	e.
27	30.10	30.10	73.8	73.0	78	69	65.8	65	65.0	65	e.	12	e.	18	T.	T.	5	S.-cu.	e.	5	S.-cu.	e.
																	2	N.	e.			
28	30.13	30.13	73.4	72.7	79	71	65.0	63	64.2	63	ne.	7	ne.	4	0.00	T.	7	S.-cu.	e.	few.	Cu.	e.
29																						
30																						
31																						
Mean.	30.070	30.054	71.0	70.5	76.2	65.8	64.5	70.5	64.4	71.8	ne.	5.7	ne.	6.4	0.23	0.03	4.1	S.-cu.	e.	3.5	S.-cu.	e.

Observations are made at 8 a. m. and 8 p. m., local standard time, which is that of 157° 30′ west, and is 5h and 30m slower than 75th meridian time. *Pressure values are reduced to sea level and standard gravity.